NOISE ELEMENT

OF THE

SOUTH SAN FRANCISCO

GENERAL PLAN

Adopted: September 26, 1990
Resolution No. 140-90

SECTION I

INTRODUCTION

INTRODUCTION:

The Noise Element of the South San Francisco General Plan is a policy document through which potential noise issues can be evaluated and mitigated through the project review and long range planning process. It is intended that this document be adopted as the Noise Element of the South San Francisco General Plan in accordance with the provisions of Section 65302(f) of the California Government Code.

For the purposes of this document, noise is defined as a sound or series of sounds that are intrusive, irritating, objectionable and/or disruptive to daily life. The overall goal of this document is to provide as noise-free an environment as possible for the residents of South San Francisco. Noise sources in the City range from the mildly irritating (i.e. distant dog bark) to the genuinely disruptive (i.e. low flying aircraft) It must be noted that opinions as to what constitutes noise is very subjective, e.g. what one considers noise another might consider music. This document attempts to address noise as it is perceived by the majority of the population.

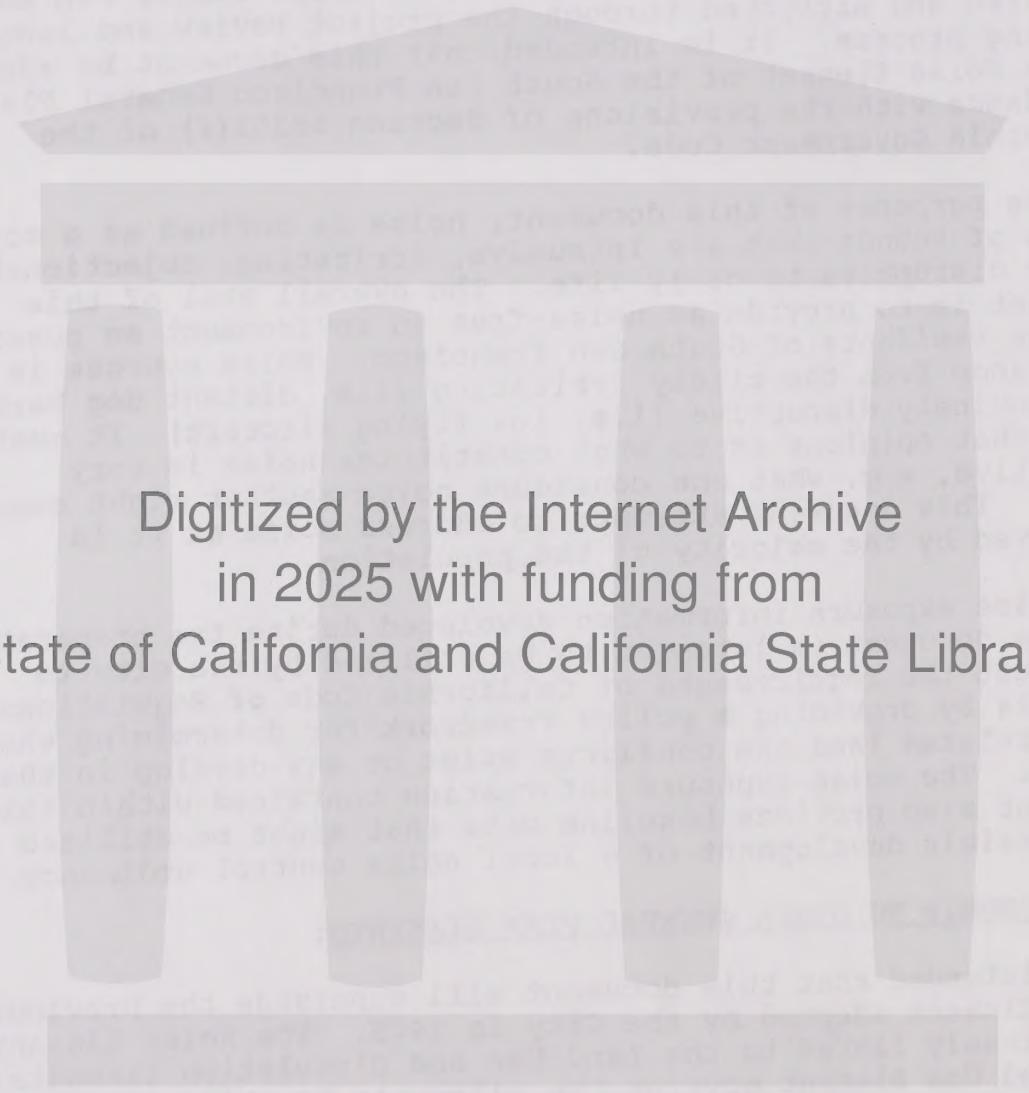
The noise exposure information developed during the preparation of this document is intended to be utilized by the City to implement the requirements of California Code of Regulations, Title 24 by providing a policy framework for determining whether noise related land use conflicts exist or may develop in the future. The noise exposure information contained within this document also provides baseline data that might be utilized in the possible development of a local noise control ordinance.

RELATIONSHIP TO OTHER GENERAL PLAN ELEMENTS:

It is intended that this document will supersede the previous Noise Element adopted by the City in 1975. The Noise Element is most closely linked to the Land Use and Circulation Elements. The Land Use Element governs the allowable locations of various types of uses and, thus, controls the location of noise sensitive land uses. The Circulation Element depicts the location of transportation routes, both current and planned, and thus designates the sources transportation noise.

AUTHORITY AND SCOPE:

The "Guidelines for the Preparation and Content of Noise Elements of The General Plan" have been adopted and published by the California Office of Noise Control (ONC) and reflect the



requirements of Section 65302(f) of the California Government Code. The ONC Guidelines require that major noise sources and noise sensitive land uses be identified and impacts quantified through the preparation of generalized noise exposure contours for both the current and projected conditions within the community.

In accordance with the requirements of the Government Code and the ONC Guidelines, noise exposure information has been developed for the following sources in South San Francisco:

1. Aircraft operations
2. Highways, freeways, & major local streets
3. Railroad operations
4. Local industrial facilities

Noise sensitive types of uses that have been considered in the preparation of this Noise Element include:

1. Residential Development
2. Schools
3. Hospitals, rest homes, and long term medical/mental care facilities.
4. Churches

NOISE DESCRIPTORS:

Contours depicting noise exposure information, under ONC Guidelines, may be developed and quantified using either the Community Noise Equivalent Level (CNEL) or the Day-Night Average Level (Ldn) descriptors. Both CNEL and Ldn descriptors reflect the total noise exposure at a given location for an annual average day with weighting to reflect the increased sensitivity to noise during the evening and nighttime hours. The two descriptors are considered to be roughly equivalent with the variation between the two averaging approximately plus or minus 1.0 dB.

The CNEL descriptor is used in relation to major continuous noise sources such as aircraft operations and traffic. State noise law references CNEL levels so, in order to maintain consistency, this document will also utilize the CNEL descriptor.

In defining policies related to localized or intermittent noise sources, this document uses the Leq or Equivalent Energy Level descriptor. The Leq descriptor is defined as the sound level corresponding to a steady state sound level containing the same total energy as a time varying signal over a given sample period. For the purposes of this document, the sample period is one hour. The use of the hourly Leq descriptor allows defining maximum noise level that can be generated per hourly period. Noise levels based on the Leq descriptor can be determined in a relatively short period of time without extensive noise monitoring and/or computer modeling. Both descriptors are

developed utilizing the A-weighted response curve that closely models humans response to various noise frequencies.

EFFECTS OF NOISE ON HUMANS:

As many citizens of South San Francisco are aware, noise can significantly impact the quality of life. These impacts range from the mild disruption of a conversation to a complete disruption of the sleep cycle. While both State and Federal Guidelines indicate that exterior noise levels of less than 65 dB CNEL are compatible with noise-sensitive land uses, experience has shown that single event noise impacts outside of the 65 dB CNEL can still result in major disturbances to daily life.

Unfortunately the regulation of single event noise levels by local jurisdictions is difficult, if not impossible. Past attempts by the State to regulate single event noise levels have resulted in court determinations that such regulations are, in effect, regulating interstate commerce which can only be regulated by the Federal Government. A more detailed discussion of noise effects on humans is contained in Section III, Technical Appendix.

SOUTH SAN FRANCISCO NOISE ENVIRONMENT:

Noise is a very complex issue with various noise sources working in combination. Sources will be addressed in this document individually while recognizing that the overall problem is very complex. This rational is based on the concept that a reduction in each of the various sources will result in an overall reduction of noise exposure to the community. It is this overall reduction that is the generalized goal of this document.

The single major source of noise community-wide is San Francisco International Airport. Aircraft departing Runways 28 Left and 28 Right overfly South San Francisco resulting in significant noise impacts to a number of noise-sensitive land uses. Aircraft departing from Runways 1 Left and 1 Right bound for the south overfly various parts of the City. While these overflights are at somewhat higher altitudes than the aircraft departing Runways 28, they also impact various noise-sensitive land uses within the City. Aircraft departing from Oakland International Airport also overfly South San Francisco but these aircraft are usually at altitudes above 4000 feet and, thus, have minimal impacts on the City.

Other transportation noise sources within the City include Highways 101, 280, 82 (El Camino Real), the Southern Pacific railroad corridor, and various other major local streets. Other sources include the potential B.A.R.T. extension through South San Francisco, various industrial sources, and miscellaneous point sources (i.e. leaf blowers, dogs, etc...). While this document briefly discusses the above miscellaneous sources, it focuses primarily on major noise sources in the City.

SECTION II

POLICIES & OBJECTIVES

This chapter contains the objectives and policies the City has defined in order to achieve the best noise environment possible for the citizenry. The overall goal of this document is as follows:

> **"To provide a safe and pleasant environment for all citizens, workers, and visitors of South San Francisco."**

Many factors must be considered when evaluating potential developments for noise impacts. For example, construction of new housing results in short term noise increases due to construction activities, but longer term benefits to the general quality of life. One cannot become so focused as to sacrifice long term quality of life issues for the sake of short term goals.

Policy N-1 "All new noise sensitive land uses developed within areas impacted by 65 dB CNEL or more, regardless of the noise source(s), shall incorporate mitigation measures to ensure that interior noise levels do not exceed 45 dB CNEL."

It is imperative that safe and comfortable noise levels be obtained within the interior spaces of noise sensitive land uses. 45 dB CNEL is the accepted standard for interior noise levels and the City's utilization of this standard is consistent with both State law and the policies of various regional and local bodies dealing with noise issues.

Types of mitigation measures that might be included to achieve the 45 dB CNEL goal include, but are not limited to, dual pane windows, wall/ceiling insulation, weatherstripping, and central ventilation systems. Although this could be incorporated as a condition of approval for any discretionary permits (including tentative subdivision maps), a modification to the Building Code would make this requirement applicable to all designated noise sensitive uses, including new individual single family dwellings.

AIRCRAFT NOISE:

While some have called for the closure of SFIA as a solution to the major noise problem, such an action is unrealistic. Due to previous court rulings, it is not feasible for local cities to attempt to regulate the noise generated by overflying aircraft. The only way to attempt to alleviate the problem is to monitor

activities of the airport and to work with the airport, through various local bodies such as the Airport/Community Roundtable, to address the problem.

OBJECTIVE: "To mitigate and reduce noise impacts from aircraft generated sources."

Policy N-2 "As appropriate, the City of South San Francisco shall continue to participate in the various regional and local bodies to reduce aircraft noise impacts to the City."

Various local and regional bodies have been established to address the issue of aircraft noise. The Airport/Community Roundtable was established to monitor the implementation of the Joint Action Plan prepared in 1980. The Airport/Community Roundtable serves as a forum for public and local governmental input regarding airport generated noise impacts. It should be noted that the Airport/Community Roundatble has no legislative authority over airport or local governmental actions.

The San Mateo County Airport Land Use Commission (ALUC) was established in response to State requirements that counties develop and administer land use compatibility plans in areas impacted by aircraft operations. The San Mateo County Airport Land Use Plan addresses both safety and noise issues associated with aircraft operations and defines areas where certain policies are applied to addresses those impacts. The Airport Land Use Commission reviews general plans and associated amendments for communities within airport impact areas to determine consistency with the ALUC Plan. A city can overrule the ALUC determination provided certain findings are made in the override process.

Policy N-3 "The City of South San Francisco shall continue to support the concept of not shifting noise from one impacted community to another."

It has been a long standing policy of various jurisdictions and regional bodies in the vicinity of San Francisco International Airport that impacts to one community not be increased in order to lessen impacts to another community. This policy also engenders the concept that one community should not receive a inordinate amount of noise to the benefit of other communities.

Policy N-4 "The City shall oppose inordinate expansion of international traffic at San Francisco International Airport and shall support the concept presented in the Regional Airport Plan that traffic of all types should be distributed between the three regional international airports and not concentrated at one facility, specifically San Francisco International Airport."

Impacts to noise sensitive land uses occur primarily due to departures on Runways 28 Left and Right. Aircraft departing Runways 28 climb directly over noise-sensitive land uses at altitudes between several hundred feet MSL and 2000 feet MSL. The most serious impacts result from international departures from Runways 28 which are generally large (i.e. DC-10's, B-747's), heavily laden aircraft bound for the Pacific Rim. These aircraft climb quite slowly and thus impact a greater geographic area than other aircraft. In addition, as the large aircraft climb more slowly, they are seen at lower altitudes and the impression of impact is greater to the general public. Increases in these types of flights is a serious concern.

Policy N-5 "The City shall urge adoption of strong, enforceable noise regulations by the San Francisco Airports Commission that eliminate nighttime departures by Stage 2 aircraft."

Nighttime departures are also a concern as people are generally more sensitive to noise events while sleeping and during hours when ambient noise levels are lowest. Eliminating the nighttime departures of noisy aircraft would serve to lessen this problem.

Policy N-6 "The City of South San Francisco shall do all within its power to ensure continued funding of the Noise Insulation/Noise Easement Program and support the concept that, even in the absence of any Federal funding, San Francisco International Airport provide matching funding for the Noise Insulation Program."

One method through which noise impacts have been mitigated is the Noise Insulation/Noise Easement Program. This program involves the retrofitting of homes to achieve interior sound levels of 45 dB CNEL or less and thus improve the livability of interior spaces. This program currently depends on both Federal funding and funds from SFIA.

Grants are obtained from the Federal Aviation Administration to cover 80% of the cost with the airport contributing the remaining 20% of the costs. These funds are available from the Federal government based on the Federal Aviation Regulations Part 150 Study.

South San Francisco was involved in the pilot program for the Noise Insulation and more and more cities are requesting funding as their studies are completed. As these requests grow in number, the availability of Federal funds for South San Francisco becomes more questionable and is not guaranteed.

It is imperative that the program continue and that an adequate level of funding be maintained. An appropriate vehicle for ensuring the continued availability of matching funds from the airport is through the Title 21, State Noise Standards, variance process. Due to the fact that the airport impacts noise-sensitive land uses, it must obtain a "Variance to Operate" from the State Department of Transportation in order to continue operating. Through this variance process conditions are imposed which attempt to mitigate noise impacts. As there are sources other than the Federal government from which the City could obtain funding, obligating the airport to continue to provide matching funds in the event that Federal funding is limited or completely unavailable, is appropriate.

It must be noted that this program only works to reduce interior noise levels and does nothing for the exterior living areas (i.e. patios, decks, and yard areas).

OBJECTIVE: "To ensure adequate and correct evaluation of aircraft noise impacts by the San Mateo Airport Land Use Commission."

Policy N-7 "The City shall urge adoption by the San Mateo Airport Land Use Commission of a continually updated noise exposure map for the San Francisco International Airport environs."

The current map utilized by the San Mateo Airport Land Use Commission in defining policy areas was developed in 1980 and does accurately reflect the current noise impact area. In addition, if a map of 1990 noise contours were to be adopted it could be outdated in a couple of years. It seems, therefore, most appropriate to incorporate a

continually updated map into the Airport Land Use Commission Plan. The map could, for example, be published once a year, be based on data from the previous year, and be incorporated into the Airport Land Use Plan by reference.

OBJECTIVE: "To eliminate potential aircraft noise impacts to new land use proposals."

Policy N-8 "The City shall evaluate development proposals based on the criteria contained in Table N-1 and shall only approve proposals that are consistent with criteria contain therein."

When evaluating new development proposals the criteria contained in Table N-1 shall be utilized to determine land use compatibility and possible requirements for acoustical studies. The Noise Exposure Map for 1989, contained in the Technical Appendix of this document, shall be utililized in evaluating the level of aircraft noise impacts to South San Francisco. The criteria contained in Table N-1 are consistent with the policies of the San Mateo Airport Land Use Commission's plan for the San Francisco International Airport environs.

OBJECTIVE: "To ensure adequate State regulation of aircraft noise problems."

Policy N-9 "The City shall oppose changes to Title 21, California Noise Standards, that reduce the power of the State to control aircraft noise impacts."

Over the past several years changes have been proposed to Title 21 that could have reduced the regulations' effectiveness. Many cities, including South San Francisco, have opposed these types of changes and should continue to oppose "watering down" of the regulations.

RAILROAD NOISE SOURCES:

South San Francisco is fortunate in that most current rail operations have negligible impacts on noise-sensitive land uses. Rail lines are located in the predominately industrial areas east of the Bayshore Freeway or south of Railroad Avenue. These areas are developed with either industrial or commercial types of uses which are not significantly impacted by railroad generated noise.

The Southern Pacific right-of-way, used by CalTrain and Southern Pacific freight does come into close proximity of residential uses on Village Way. This area, however, is already fully developed. There are several railroad spurs that do border along residential uses (i.e. along Railroad Ave.). These spurs,

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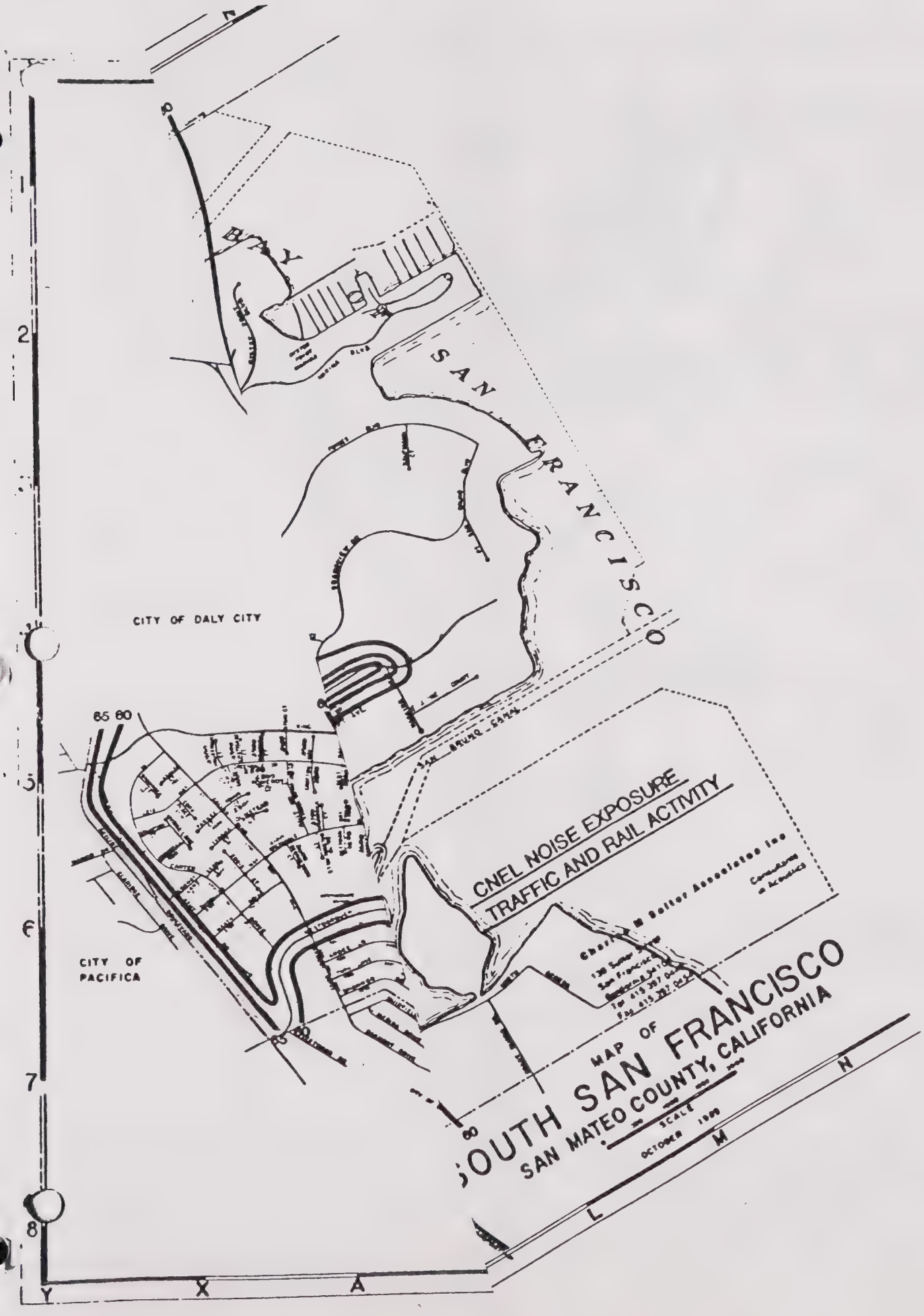
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CITY OF PACIFICA
CNEL NOISE EXPOSURE
TRAFFIC AND RAIL ACTIVITY
MAP OF
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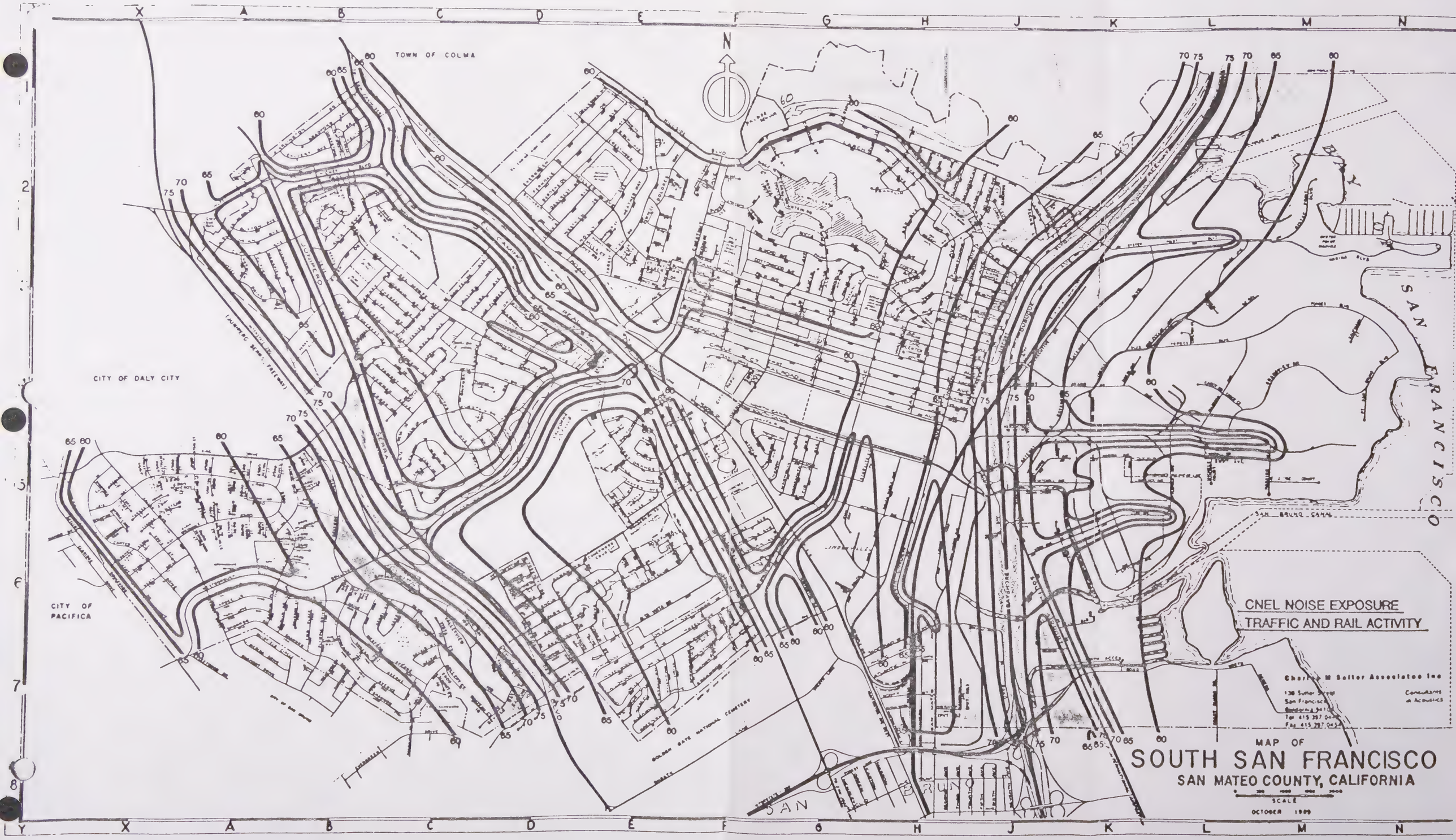

TOWN OF COLMA
CITY OF DALY CITY
CITY OF PACIFICA
SAN FRANCISCO
SAN BRUNO CANAL
CNEL NOISE EXPOSURE
TRAFFIC AND RAIL ACTIVITY
MAP OF
SOUTH SAN FRANCISCO
SAN MATEO COUNTY, CALIFORNIA
SCALE
OCTOBER 1979

for
Aircraft Noise Impacts

Table N-1

LAND USE	CNEL RANGE	GENERAL LAND USE CRITERIA
Residential, etc. Single family Multi-family Mobile homes Schools Libraries Churches Hospitals Nursing homes Auditoriums	less than 65	Satisfactory, with little noise impact and requiring no special noise insulation requirements for new construction.
	65 to 70	New construction or development should be undertaken only after an analysis of noise reduction requirements is made and needed noise insulation features included in the design.
	greater than 70	New construction or development should not be undertaken.
Commercial Retail Restaurants Office Bldgs. Hotels-Motels Movie theaters Sports arenas Playgrounds Cemeteries Golf courses	less than 70	Satisfactory, with little noise impact and requiring no special noise insulation requirements for new construction.
	70 to 80	New construction or development should be undertaken only after an analysis of noise reduction requirements is made and needed noise insulation features included in the design.
	greater than 80	New construction or development should not be undertaken unless related to airport activities or services. Conventional construction will generally be inadequate and special noise insulation features should be included in construction.
Industrial Manufacturing Transportation Communications Utilities	less than 75	Satisfactory, with little noise impact and requiring no special noise insulation requirements for new construction.
	75 to 85	New construction or development should be undertaken only after an analysis of noise reduction requirements is made and needed noise insulation features included in the design.
	greater than 85.	New construction or development should not be undertaken unless related to airport activities or services. Conventional construction will generally be inadequate and special noise insulation features should be included in construction.
Open Agriculture Mining Fishing	less than 75	Satisfactory, with little noise impact and requiring no special noise insulation requirements for new construction.
	greater than 75	Land uses involving concentrations of people (spectator sports and some recreational facilities) or of animals (livestock farming and animal breeding) should generally be avoided.

however, are not frequently used and do not cause major noise impacts.

OBJECTIVE: "To minimize noise impacts that might be generated by the proposed BART extension."

Policy N-10 "With respect to any BART extension, the City supports the concept of a subterranean trackway particularly in the vicinity of noise-sensitive land uses."

A potential source of rail generated noise is the proposed Bay Area Rapid Transit (BART) extension from Daly City to the airport. The final alignment has not yet been determined but it is anticipated that the alignment will coincide with the Southern Pacific Railroad alignment through South San Francisco. It is expected that a station will be proposed in the area of the intersection of Chestnut Avenue and El Camino Real. While it is difficult to develop any policies until a final alignment plan is presented, the above general policy should serve to guide decision makers in their evaluation of the proposed BART extension.

FREEWAY & HIGHWAY NOISE:

There are a number of highways and freeways that impact various areas of South San Francisco. These include Highways 101, 280, 82 (El Camino Real), and 35 (Skyline Blvd.). Traffic noise from highways (and local streets) is dependent primarily on the speed of traffic and the percentage of truck traffic. The volume of traffic plays a lesser role in the equation as a doubling of traffic volume results in a 3dB to 5dB increase in noise.

Due to recent technological advances, the primary source of noise from newer automobiles is high frequency tire noise. Sources for older automobiles include engine noise, exhaust noise and wind noise in addition to tire noise. Truck sources include engine noise, exhaust systems, tires and wind noise. While tire noise from autos is generally located at ground level, truck noise sources can be located as high as ten to fifteen feet above the roadbed due to tall exhaust stacks. Also, engine and wind noise sources are higher off the roadbed than automobiles.

OBJECTIVE: "To mitigate and/or reduce noise impacts from vehicular traffic."

Policy N-11 "Development proposals located within the 65 dB CNEL contour due to traffic noise shall include analysis by a qualified acoustical engineer so as to determine appropriate measures to mitigate traffic noise impacts."

Policy N-12 "City staff shall inform homeowners proposing additions, particularly second story additions, in areas of traffic impacts of such impacts and suggest incorporation of mitigation measures."

Various types of mitigation measures can be incorporated into larger development projects to mitigate traffic noise. These types of measures include boundary berms, walls, and site design. Areas that are located within the 65 dB CNEL contour (based of roadway sources) are, for the most part, substantially developed and it is not reasonable to require an individual property owner to construct substantial site improvements should an addition be desired. In this case City staff should inform the applicant of noise issues and general methods of mitigation (i.e. double pane windows, insulation, weatherstripping, etc...) It is, however, reasonable to require that larger development proposals incorporate some of the above referenced mitigation measures as part of the project approval.

Policy N-13 "The City shall support enforcement of California Motor Vehicle Code, particularly those sections pertaining to adequate muffler systems."

Excessively noisy vehicles are sources of noise and enforcement of State regulations is an appropriate corrective action. This policy is intended to apply to City owned vehicles as well as those of the general public.

INDUSTRIAL NOISE SOURCES:

OBJECTIVE: "To mitigate noise impacts from industrial facilities located near noise-sensitive land uses."

Policy N-14 "All high noise generating devices (i.e. crushers, shredders, compressors, etc...) shall be located within an enclosed structure."

Policy N-15 "Industrial developments that will result in noise impacts to noise-sensitive land uses greater than 60 dB CNEL shall not be permitted."

There are several areas in South San Francisco that are substantially developed with industrial uses. As much of the industrial development is located east of Highway 101, noise is buffered by

noise from Highway 101. On the west side of Highway 101 there are several industrial areas that border on sensitive areas. These include the areas along Railroad Avenue east of West Orange Ave, and the areas bordering the north and east sides of the Mayfair Village subdivisions. While many industrial type uses can be established that will not cause noise problems, project review should identify major noise sources associated with development and evaluate the potential impacts to noise-sensitive land uses.

OBJECTIVE: "To provide a safe working environment for those employed in industrial facilities throughout the City."

Policy N-16 "The City shall support enforcement of both State and Federal regulations regarding noise in the workplace."

Excessive interior noise levels can also be a hazard to the health of workers and should not be permitted.

MISCELLANEOUS NOISE SOURCES:

Policy N-17 "The City shall consider the development and adoption of a Noise Ordinance to address various miscellaneous noise sources."

In addition to the "major" noise sources in the City, there are other miscellaneous sources that should be addressed. These types of sources include such things as loud stereos (both auto and home), loud parties, power tools, and barking dogs. As the Noise Element is a policy document, it is not appropriate to present standards for such sources in this document. The appropriate vehicle for addressing these concerns would be the development of a Noise Ordinance that would be enforced by the Police Department. As the impacts from these miscellaneous sources can be as significant as the other sources discussed in this document, development of a Noise Ordinance is appropriate.

SECTION III

TECHNICAL APPENDIX

CITY OF SOUTH SAN FRANCISCO
NOISE MEASUREMENTS & ANALYSIS
FOR CITY NOISE ELEMENT

CSA PROJECT NO: 89-365

Prepared for:

Ms. Jean T. Smith
Planning Director
City of South San Francisco
Planning Division
400 GrS. San Francisco, CA 94083

Prepared by:

Mr. John C. Freytag, P.E.
Principal Consultant

6 April, 1990

SUMMARY & CONCLUSIONS

This report presents the results and conclusions from noise monitoring and noise measurement surveys undertaken throughout the City of South San Francisco. This work was contracted by the City to obtain information for updating the Noise Element of the General Plan for the City of South San Francisco. These consulting services were comprised of:

1) Continuous noise monitoring at three locations,
2) Noise measurements at eight locations,
3) Computation and layout of noise exposure contours for all traffic and rail activities ,
4) Gathering and forecasting existing and future noise exposure conditions from aircraft flyovers, and
5) Assessment of the relative noise exposure contributions from aircraft and traffic noise sources.

From the noise exposure contours and analysis, the following conclusions are presented regarding the noise environment in the City of South San Francisco:

- Residential, commercial and industrial areas on the east side of the City are substantially impacted by noise from the Bayshore Freeway.

- The Shearwater site currently receives a CNEL noise contribution between 65 dB and 75 dB from Bayshore Freeway traffic, and 60 dB uniformly from aircraft flyover activity. The total CNEL noise exposure at Shearwater varies between 66 dB on the east end and 75 dB on the west side.

- Residential areas in the center and western portions of the City are substantially exposed to noise from Interstate 280, Junipero Serra Blvd, and El Camino Real.

- Preliminary information indicates that the noise exposure from traffic and rail activities throughout South San Francisco will remain almost unchanged for the next 15 years.

- CNEL noise exposure from aircraft flyover activities is expected to decrease by approximately 5 dB over the next 15 years.

Appendix A, FUNDAMENTAL CONCEPTS OF COMMUNITY NOISE, explains general concepts and terminology used throughout this report. The traffic and rail activity contours are shown on a single figure while the aircraft noise contours are shown independently on a separate figure. This was done for clarity because the superposition of aircraft contours over the highway contours presents a more complex and somewhat

confusing depiction of the total noise environment. Additionally, current information on surface streets within South San Francisco and Caltrans information on state and federal highways indicates that the traffic noise environment will be largely unchanged over the next 15 years. The aircraft noise environment, however, is expected to decrease by approximately 5 dB over this time period due to retirement of the older, noisier, Stage 2 fleet.

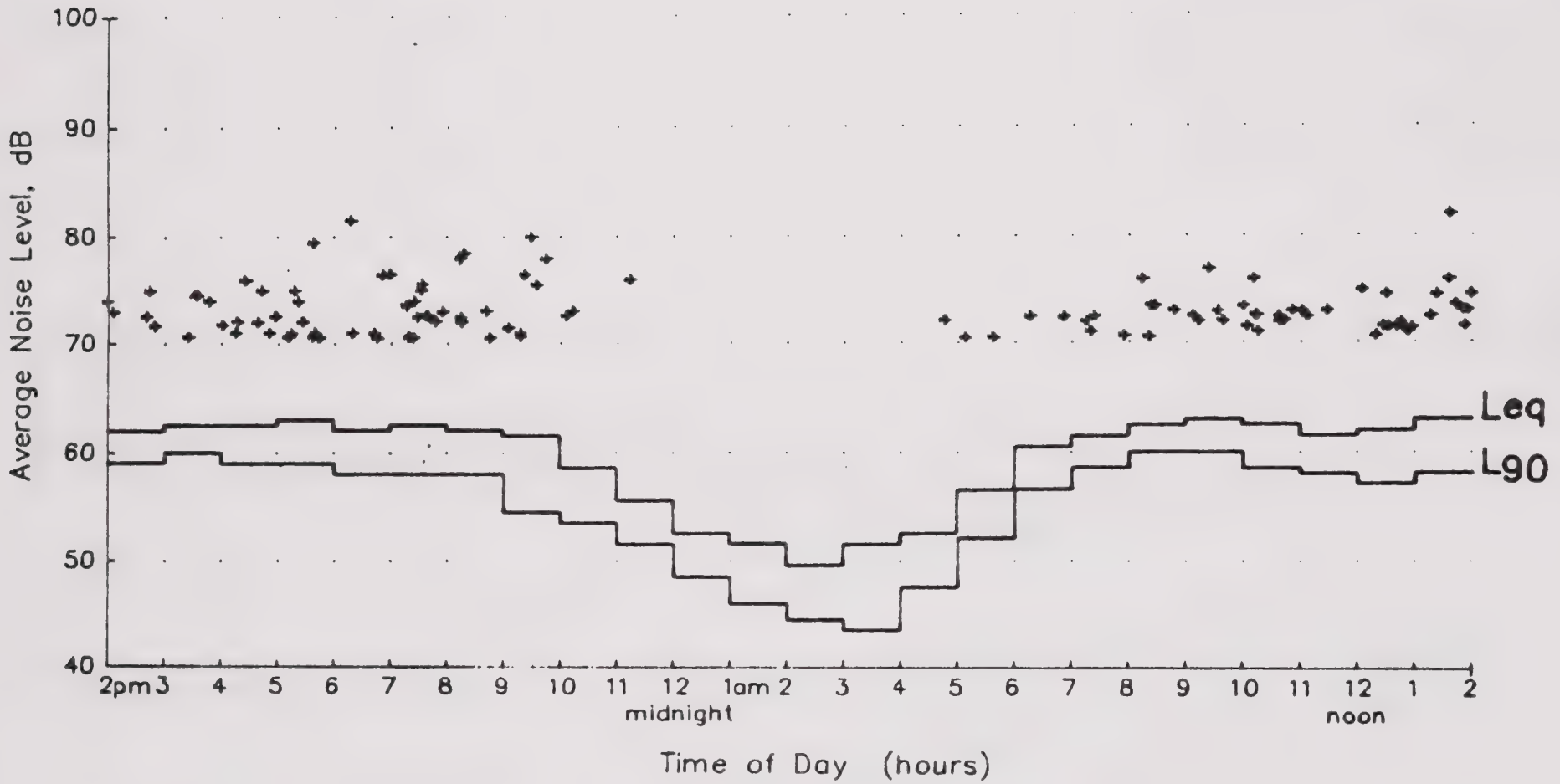
NOISE MONITORING

Noise monitoring was conducted at three sites continuously over (a minimum of) 24 hours within South San Francisco. These long term monitoring locations, selected to typify variation in major noise sources throughout the day, evening and nighttime periods recorded the noise environments from:

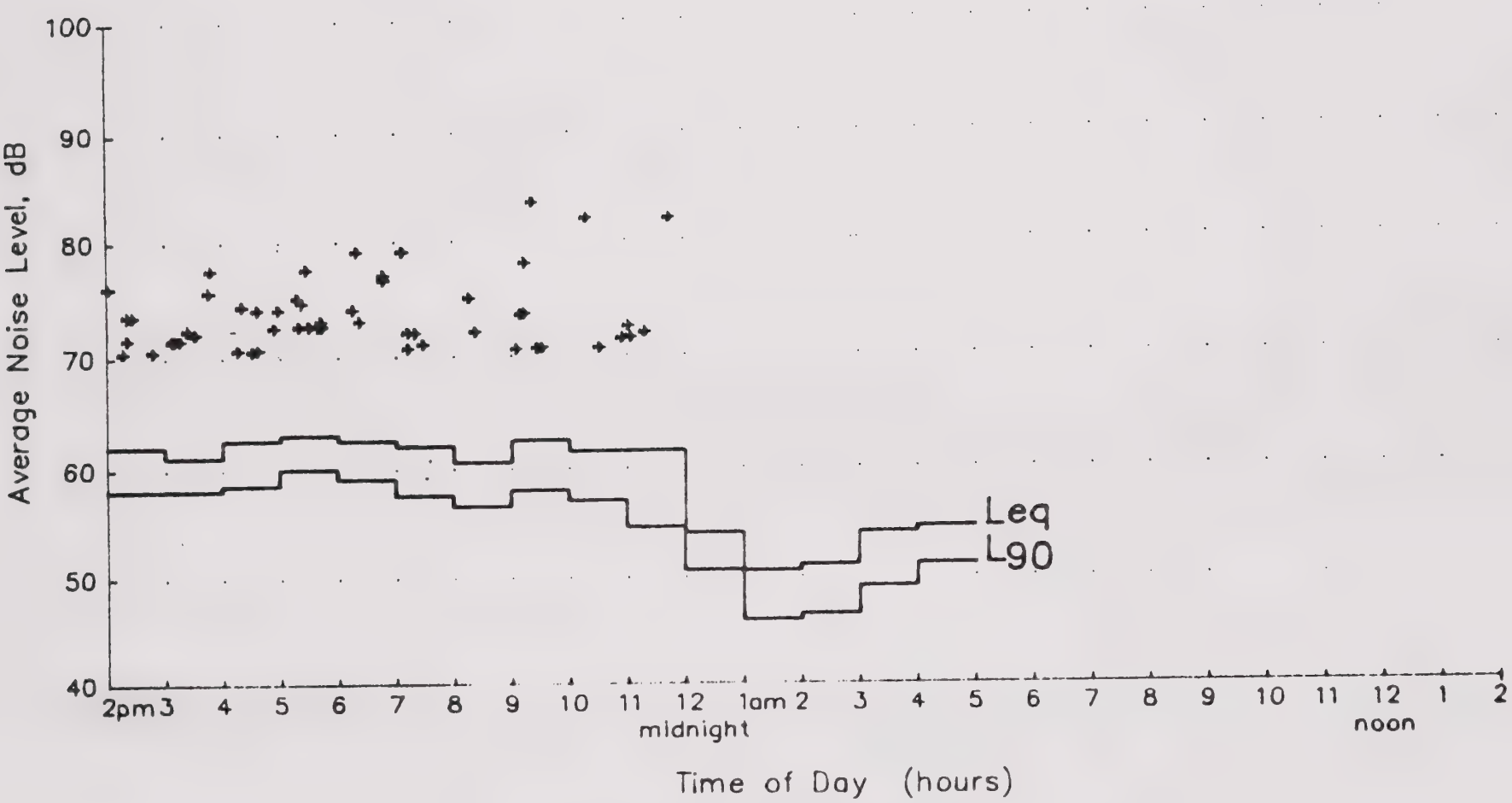
- o Bayshore Freeway (at the Shearwater site)
- o Interstate 280
- o El Camino Real

Noise monitoring was conducted at the monitoring sites shown on Figure 1 on January 23-24, 1990 at the El Camino and I-280 locations. Monitoring was not conducted at the Shearwater site at that time due to ongoing construction activity which would have biased monitoring results. Monitoring at the Shearwater site was conducted over a 37 hour period from February 28 to March 2, 1990. This monitoring measured the variation and noise exposure throughout the day, evening and nighttime period from the Bayshore Freeway. Almost all noise monitors were programmed to record the hourly L_{eq} values (i.e., the hourly noise level, HNL), various statistical parameters describing the noise variation hourly, and individual aircraft flyover events (by recording all single event activities over a pre-set threshold level).

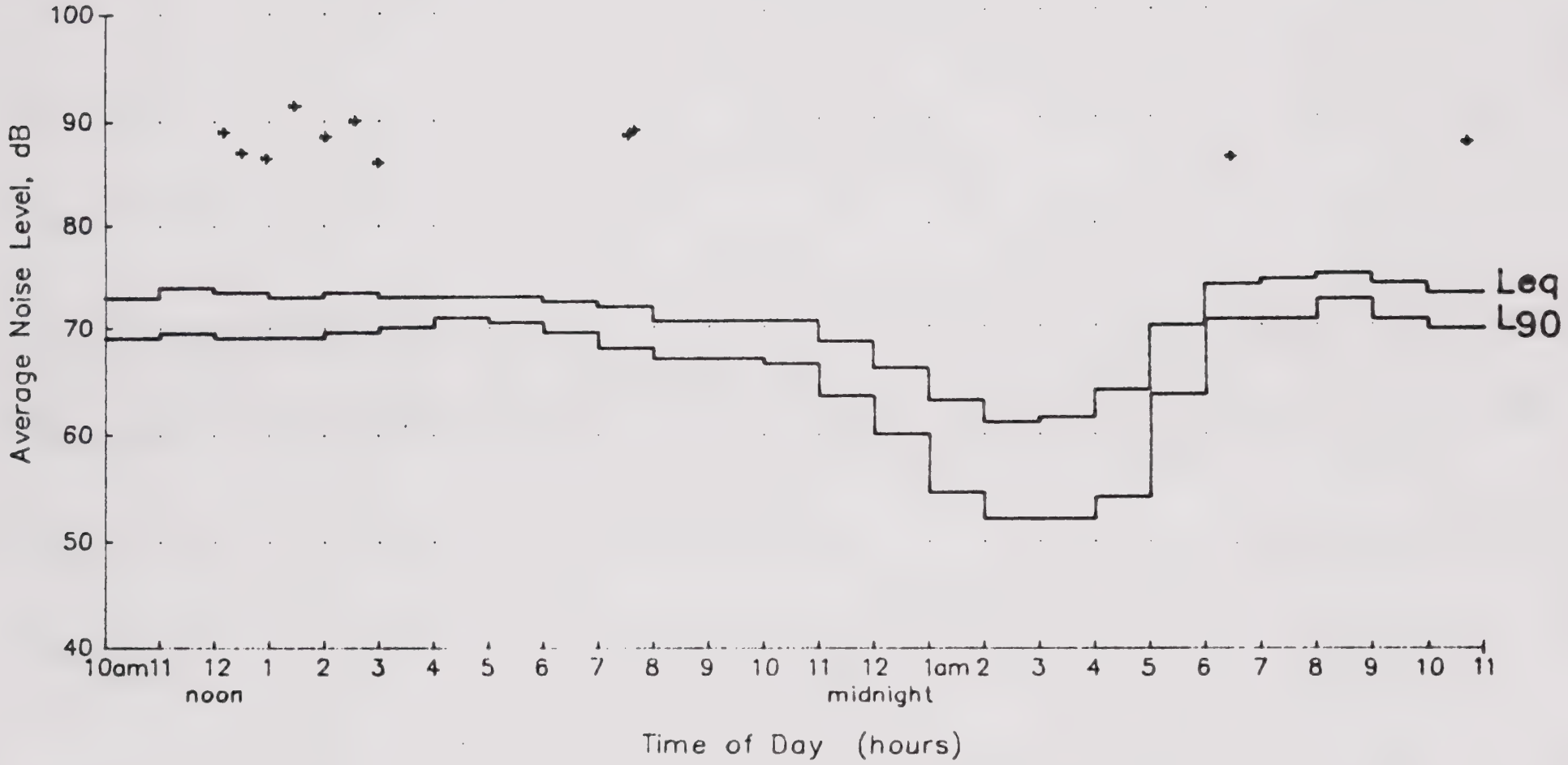
Monitoring results are shown graphically in the following three figures, and are also tabulated in Appendix B of this report. Aircraft flyover events are tabulated in Appendix B in a separate "Exceedence Report" showing the independent noise exposure contributions from traffic activity and aircraft flyover operations.



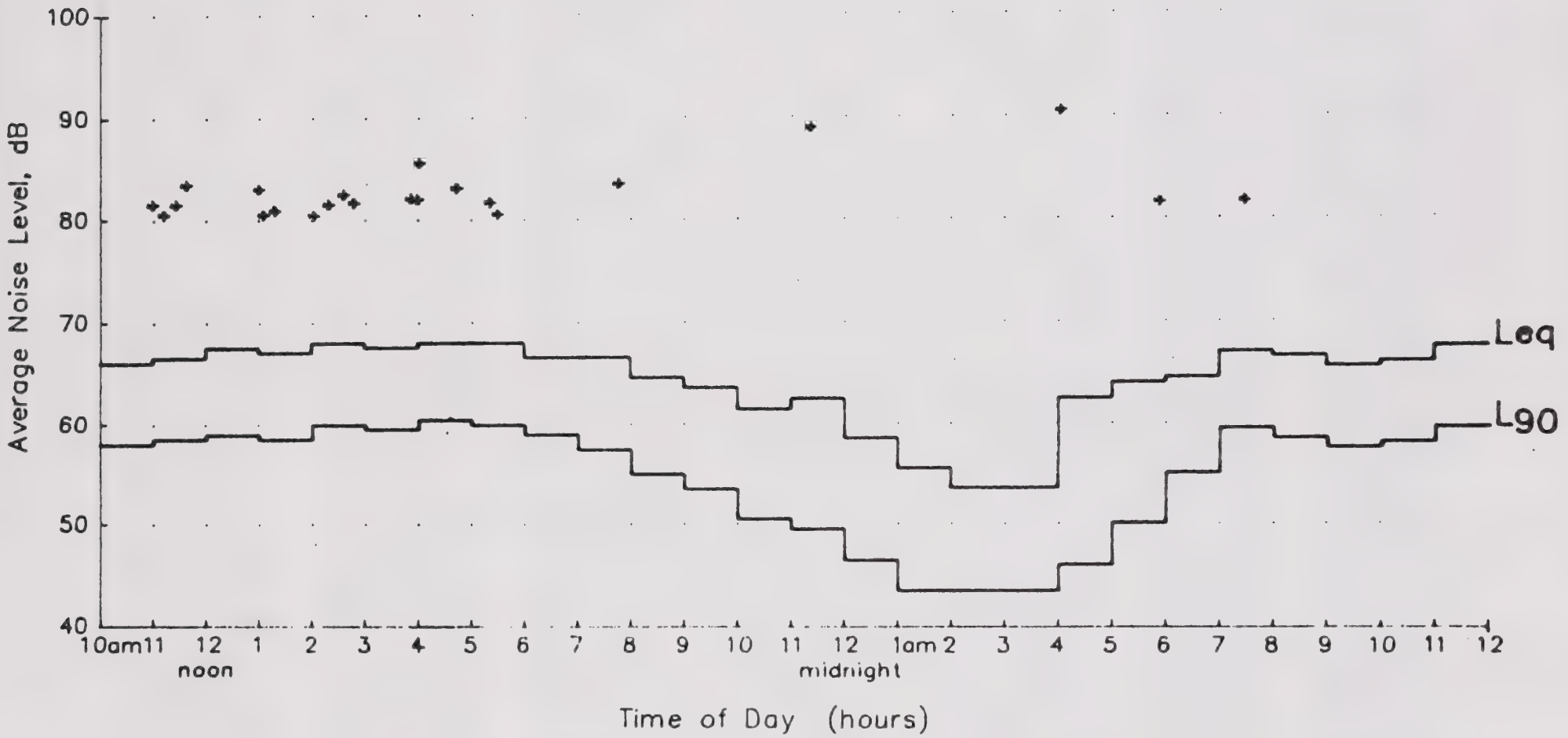
CITY OF SOUTH SAN FRANCISCO
SHEARWATER MONITORING
FEBRUARY 28 – MARCH 2, 1990



CITY OF SOUTH SAN FRANCISCO
SHEARWATER MONITORING
FEBRUARY 28 – MARCH 2, 1990



CITY OF SOUTH SAN FRANCISCO
I–280 MONITORING
JANUARY 23–24, 1990



CITY OF SOUTH SAN FRANCISCO
EL CAMINO MONITORING
JANUARY 23–24, 1990

NOISE MEASUREMENTS

In addition to the noise monitoring, short term noise measurements were made at eight locations throughout the City. These measurements were typically made for a 15 minute period to typify the noise environment in representative areas. Table A shows the noise monitoring gathered during these measurements.

Site No. 1 was on Carter Drive between Leix Way and Stamford Court, 5 feet from the curb. This area is a quiet residential area on the west end of town which receives background noise from Skyline Blvd. and distant I-280, with noise punctuated by occasional aircraft flyovers.

Site No. 2 was on Linden Avenue at Village Way, 15 feet from the nearside lane in the parking lot of Harris Forklift. This is a noisy industrial area in the southeast end of the commercial district which receives constant background noise in excess of 60 dB from the Bayshore freeway. Additionally, numerous truck pass-bys produce maximum noise levels.

Site No. 3 was on Dollar Avenue between South Linden and Tanforan Avenues, approximately 50 feet from the Southern Pacific Railroad tracks. Unfortunately no rail activity was present during this monitoring and the measurements served only to provide background noise levels in this industrial area from Bayshore freeway producing constant noise at 60 dB, punctuated by truck pass-bys occasionally exceeding 80 dB.

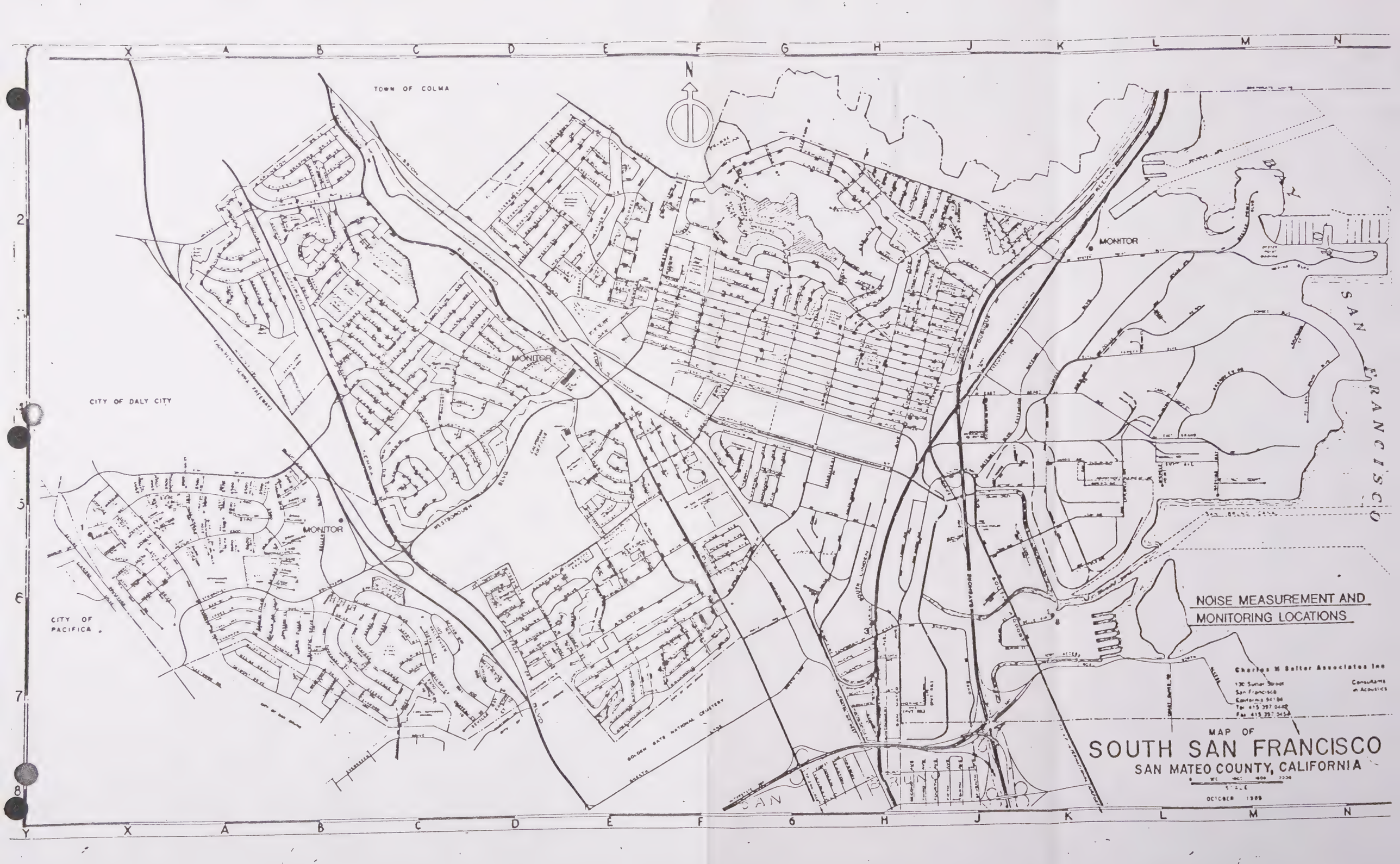
Site No. 4 was on the corner of Springwood Way and Brentwood Way, at a home site 15 feet from the curb. This is a fairly quiet residential area in the south central end of town which receives background noise from I-380 to the south at levels between 45 and 50 dB, and occasional aircraft flyovers. During the measurement period a single Boeing 747 departing San Francisco International airport passed directly overhead and produced a maximum level of 94 dB.

Site No. 5 was in the residential area in the north central part of the City at 557 Theresa, midway between LaCrosse and Romney Avenues. The low level background noise in this area between 45 and 50 dB is produced by distant I-280, Junipero Serra Blvd. and from El Camino Real. During this measurement another Boeing 747 passed nearby producing a maximum noise level of 87 dB.

Site No. 6 was at the corner of 937 Hemlock between Lincoln and Kearney Streets in the residential area in the northeast and of the City. This otherwise quiet residential area received construction noise from site development activities to the northeast, across Randolph Avenue. The background noise was dominated entirely by bulldozer activity producing constant levels between 55 and 60 dB.

Site No. 7 was at the Magnolia Plaza area on Third Street, between Magnolia and Orange Avenues. This is a residential area on the west end of the City's commercial district. The background noise in this area was dominated by the distant Bayshore freeway noise between 45 and 50 dB, with local traffic producing maximum levels between 60 and 80 dB.

Site No. 8 was in the parking lot of 140 Belle Air Road, approximately 25 feet from the curb. This is in the southeast end of town, south of the main industrial area, and immediately north of San Francisco International Airport. Here the background noise from the Airport produced constant levels between 60 and 65 dB. No flyover activity was recorded during this recording.


X A B C D E F G H J K L M N
Y X A B C D E F G H J K L M N
1
2
3
6
7
8
N
TOWN OF COLMA
CITY OF DALY CITY
CITY OF PACIFICA
MONITOR
MONITOR
MONITOR
EL CAMINO REAL
SAN FRANCISCO
SOUTH LINDEN
SAN
NOISE MEASUREMENT AND
MONITORING LOCATIONS
Charles M Salter Associates Inc
130 Sutter Street
San Francisco
California 94104
Tel 415 397 0442
Fax 415 397 3454
Consultants
in Acoustics
MAP OF
SOUTH SAN FRANCISCO
SAN MATEO COUNTY, CALIFORNIA
SCALE
OCTOBER 1989

TRAFFIC NOISE ASSESSMENT

Traffic noise throughout South San Francisco is extensive, considerably in excess of that found in most Bay Area communities. This is due to the major transportation routes running through and adjacent to the City. The loudest road in the Bay Area is the Bayshore Freeway, bordering South San Francisco on the east, which currently carries 214,000 vehicles per day, at speeds up to 60 miles per hour, with 4 percent of the vehicles comprised of trucks (of 3 or more axles). This produces a CNEL noise exposure up to 60 dB only one half a mile away. The noise contours do reflect the effects of topography, but generally do not account for attenuation provided by man-made structures such as buildings. The noise exposure contours are designed as a planning tool to identify the need for further noise investigations in areas of potentially high noise exposure. The actual noise exposure at a single site may be several dB less that that shown on the contours, due to the additional attenuation and effects provided by man-made structures. Considerable noise exposure is also evident on the west end of the City from I-280, Junipero Serra Blvd., and El Camino Real. Additionally such major thoroughfares as Westborough and Hickey Blvds. also contribute to the noise environment.

Noise exposure in the commercial area in the east and southeast portions of town is extensive due to up to 20 percent heavy truck activity. These vehicles are substantially noisier than automobiles and dominate the noise environment throughout the industrial area.

No substantial fixed noise sources (e.g. factories or other industrial facilities) were identified to substantially override the transportation noise environment. Likewise, noise from the Southern Pacific Railroad was found to be minimal compared to that from the adjacent Bayshore Freeway.

The future noise environment in South San Francisco is not expected to change dramatically. For the year 2005, the local population is expected to grow by only 4 percent, with an attendant proportional growth in surface vehicle activity. This increase in volume produces no discernible increase in noise exposure. In fact, some minor but unpredictable decrease in noise exposure may be expected over the next 15 years as future quieter vehicles replace the current vehicles.

Caltrans currently is revising their forecast for freeway and highway noise in the South San Francisco area. The current projections for the Bayshore freeway (for instance) are 158,000 to 225,000 vehicles per day, compared with the current volume of 214,000 vehicles per day. Thus the current Caltrans estimates for the Bayshore Freeway, for I-280 or for El Camino Real provide no basis for predicting future noise

exposure. Therefore, the best noise exposure estimate for South San Francisco in the year 2005 is the current noise exposure. The CNEL noise exposure contours for traffic and rail activity may be assumed to apply in both the existing and future conditions.

AIRCRAFT NOISE ASSESSMENT

Aircraft noise exposure for the existing condition was taken directly from the latest available "Quarterly Report" (for the quarter ending September 30, 1989) prepared by San Francisco International airport in compliance with Caltrans Department of Aeronautics regulations (CAC Title 21). The noise exposure contours in the following figure, shown in the solid lines, are taken directly from this report. The contours for the future condition (dashed lines) were computed from data reflecting expected growth and volume of annual aircraft operations, and the retirement of older Stage 2 aircraft within the next 15 years. This was done by analytically considering the CNEL increase between the 1989 expected annual operations (306, 792 ops) verses the 2005 predicted operations (438, 462 ops). Concurrent with this increase in aircraft volume, is a substantial decrease in the noise exposure from the individual aircraft operations. For the third quarter of 1989, 37% of all operations utilized the older, noisier, Stage 2 aircraft while 63% used newer, quieter, Stage 3 aircraft. By 2005 the current 114,000 Stage 2 aircraft will have been entirely replaced with Stage 3 aircraft, each approximately 10 dB quieter. The result of the offsetting effects of the increase in operations and decrease in noise emissions from individual aircraft is an overall decrease in CNEL noise exposure of almost 5 dB. This is a substantial decrease which would be generally noticed by the community. Several assumptions were necessary in this analysis including the same ratio of day, evening and nighttime operations, same runway use, same flight tracks, and other similar operational parameters. This represents the best available estimate at this time and has been concurred with the Program Manager of the current San Francisco International Airport Master Plan study.

Table C enables combination of traffic and aircraft noise exposure using values from each of the contours. This table simply facilitates decibel addition according to the rules from Appendix A.

TABLE A

City of South San Francisco
Noise Measurement Results
January 23, 1990

Site No.	Location	A-Weighted Values (dB) L_{eq}	L_{max}	L_{10}	L_{33}	L_{50}	L_{90}	L_{min}
1	Center Dr.	63	80	59	51	49	48	45
2	Linden Ave.	71	84	74	70	68	61	58
3	Dollar Ave.	68	83	71	64	61	56	54
4	Springwood Way	71	94	61	54	51	46	45
5	Theresa Dr.	69	87	61	52	50	45	42
6	Hemlock Ave.	62	81	63	60	59	56	55
7	Third St.	60	79	62	56	52	44	39
8	Belle Air Rd.	63	72	65	62	61	58	57

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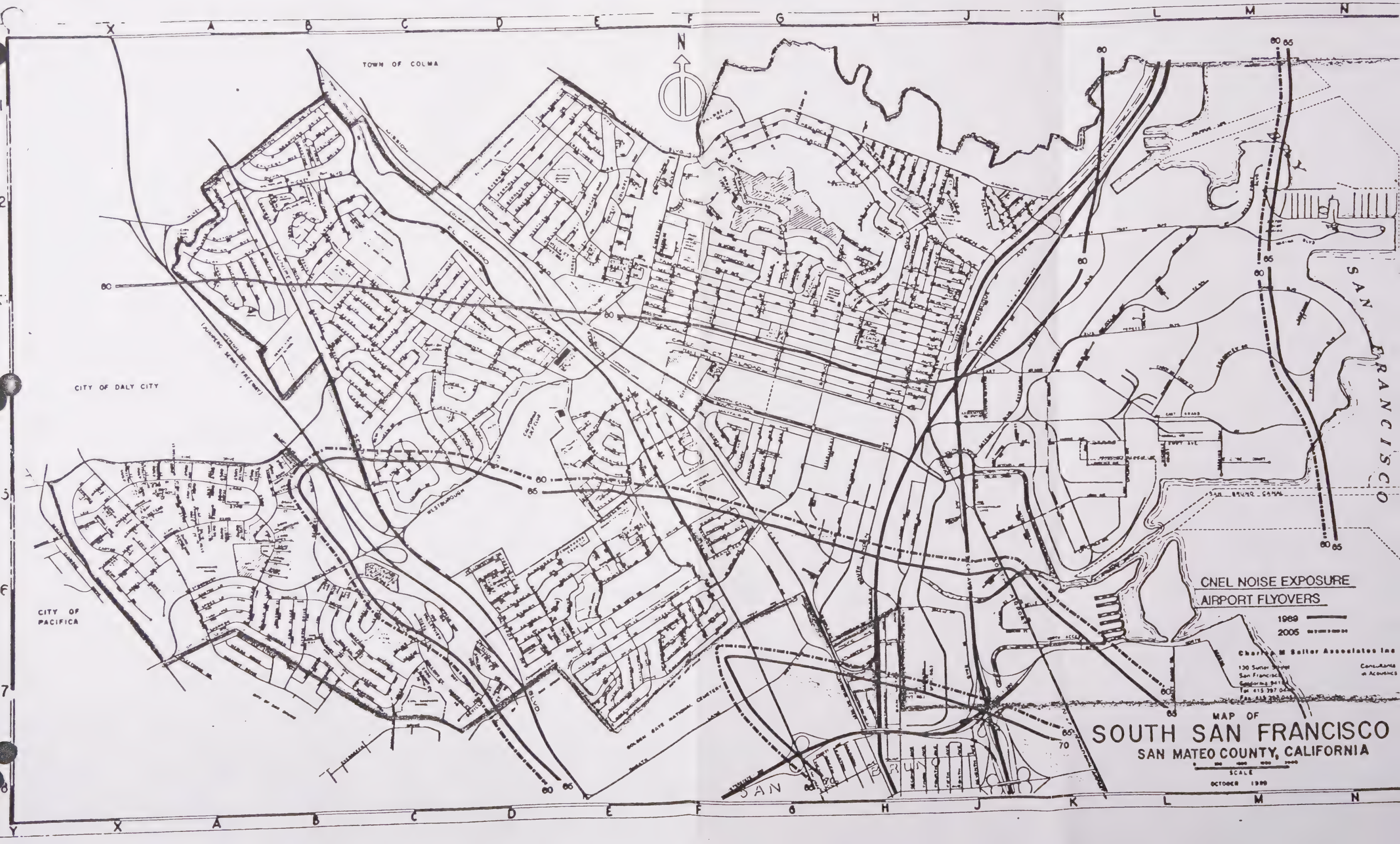

TOWN OF COLMA
CITY OF DALY CITY
CITY OF PACIFICA
SAN FRANCISCO
CNEL NOISE EXPOSURE
AIRPORT FLYOVERS
1989
2005
MAP OF
SOUTH SAN FRANCISCO
SAN MATEO COUNTY, CALIFORNIA
SCALE
OCTOBER 1990

APPENDIX A

FUNDAMENTAL CONCEPTS OF COMMUNITY NOISE

Background

Three aspects of community noise are important in determining subjective response:

- Level (i.e., magnitude or loudness) of the sound.
- The frequency composition or spectrum of the sound.
- The variation in sound level with time.

Airborne sound is a rapid fluctuation of air pressure and local air velocity. Sound levels are measured and expressed in decibels (dB) with 0 dB roughly equal to the threshold of hearing.

The frequency of a sound is a measure of the pressure fluctuations per second measured in units of hertz (Hz). Most sounds do not consist of a single frequency, but are comprised of a broad band of frequencies differing in level. The characterization of sound level magnitude with respect to frequency is the sound spectrum. A sound spectrum is often described in octave bands which divide the audible human frequency range (i.e., from 20 to 20,000 Hz) into ten segments. Figure A-1 shows a range of sound spectra for various types of sound over the audible hearing range.

Frequency Weighting

Many rating methods exist to analyze sound of different spectra. The simplest method is generally used so that measurements may be made and noise impacts readily assessed using basic acoustical instrumentation. This method evaluates all frequencies by using a single weighting filter that progressively de-emphasizes frequency components below 1000 Hz and above 5000 Hz. This frequency weighting, shown in Figure A-2, reflects the relative decreased human sensitivity to low frequencies and to extreme high frequencies. This weighting is called A-weighting and is applied by an electrical filter in all U.S. and international standard sound level meters. Some typical A-weighted sound levels are presented in Figure A-3.

Noise Exposure

Noise exposure is a measure of noise over a period of time, whereas noise level is a single value at an instant in time.

Although a single sound level may adequately describe community noise at any instant in time, community noise levels vary continuously. Most community noise is produced by many distant noise sources which produce a relatively steady background noise having no identifiable source. These distant sources change gradually throughout the day and include traffic, wind in trees, and distant industrial activities. Superimposed on this slowly varying background is a succession of identifiable noise events of brief duration. These include nearby activities such as single vehicle passbys or aircraft flyovers which cause the community noise level to vary from instant to instant.

A single number called the equivalent sound level or L_{eq} is used to describe noise varying over a period of time. The L_{eq} is the average noise exposure level over a period of time (i.e., the total sound energy divided by the duration). It is the constant sound level which would contain the same acoustic energy as the varying sound level, during the same time period. The L_{eq} is useful in describing noise over a period of time with a single numerical value.

Discrete short duration transient noise events, such as aircraft flyovers, may be described by their maximum A-weighted noise level or by their sound exposure level (i.e., SEL). The SEL value is the preferred descriptor because measured results may be more reliably repeated and because the duration of the transient event is incorporated into the measure (thereby better relating to subjective response). Maximum levels of transient events vary with instantaneous propagation conditions while a total energy measure, like SEL, is more stable. The SEL of a transient event is a measure of the acoustic energy normalized to a constant duration of one second. Figure A-4 shows this relationship. The SEL differs from the L_{eq} in that it is the constant sound level containing the same acoustic energy as a one-second event, whereas the L_{eq} is the constant sound level containing the same acoustic energy over the entire measurement period. The SEL may be considered identical to the California standard Single Event Noise Exposure Level (i.e., SENEL).

SEL values may be summed on an energy basis to compute L_{eq} values over any period of time. This is useful in modeling noise in areas exposed to numerous transient noise events, such as communities around airports. Hourly L_{eq} values are called Hourly Noise Levels (i.e., HNL values).

In determining the daily measure of community noise, it is important to account for the difference in human response to daytime and nighttime noise. During the nighttime, exterior background noise levels are generally lower than in the daytime. Most household noise also decreases at night, and exterior noise intrusions become more noticeable. People are more sensitive to noise at night than during other periods of the day.

To account for human sensitivity to nighttime noise, the DNL (or L_{dn}) descriptor was adopted by the Environmental Protection Agency to describe community noise exposure from all sources. The DNL is called the day-night sound level and represents the 24-hour A-weighted equivalent sound level with a 10-dB penalty added for the nighttime noise between 10:00 pm to 7:00 am.

In California, the Community Noise Equivalent Level (CNEL) is the adopted standard. DNL and CNEL are typically computed by energy summation of HNL values, with the proper adjustment applied for the period of evening or night. The CNEL is computed identically to the DNL but with the addition of a 5-dB penalty for evening (i.e., 7:00 pm to 10:00 pm) noise. The CNEL value is typically less than 1 dB above the DNL value. Figure A-5 shows the adjustments applied for the DNL and CNEL measures. Noise exposure measures such as L_{eq}, SEL, HNL, DNL, and CNEL are all A-weighted, with units expressed in decibels (i.e., dB).

Subjective Response to Noise

The effects of noise on people can be classified into three general categories:

- Subjective effects of annoyance, nuisance, dissatisfaction.
- Interference with activities such as speech, sleep, and learning.
- Physiological effects such as anxiety or hearing loss.

The sound levels associated with community noise usually produce effects only in the first two categories. No universal measure for the subjective effects of noise has been developed, nor does a measure exist for the corresponding human reactions from noise annoyance. This is primarily due to the wide variation in individual attitude regarding the noise source(s).

An important factor in assessing a person's subjective reaction is to compare the new noise environment to the existing noise environment. In general, the more a new noise exceeds the existing, the less acceptable it is. Therefore, a new noise source will be judged more annoying in a quiet area than it would be in a noisier location.

Knowledge of the following relationships is helpful in understanding how changes in noise and noise exposure are perceived.

- Except under special conditions, a change in sound level of 1 dB cannot be perceived.

- Outside of the laboratory, a 3-dB change is considered a just-noticeable difference.

- A change in level of at least 5 dB is required before any noticeable change in community response would be expected.

- A 10-dB change is subjectively heard as an approximate doubling in loudness and almost always causes an adverse community response.

Combination of Sound Levels

Because we perceive both the level and frequency of sound in a non-linear way, the decibel scale is used to describe sound levels. The frequency scale is also measured in logarithmic increments. Decibels, measuring sound energy, combine logarithmically. A doubling of sound energy (for instance, from two identical automobiles passing simultaneously) creates a 3-dB increase (i.e., the resultant sound level is the sound level from a single passing automobile plus 3 dB). The rules for decibel addition used in community noise prediction are:

- If two sound levels are within 1 dB of each other, their sum is the highest value plus 3 dB.

- If two sound levels are within 2 to 4 dB of each other, their sum is the highest value plus 2 dB.

- If two sound levels are within 5 to 9 dB of each other, their sum is the highest value plus 1 dB.

- If two sound levels are greater than 9 dB apart, the contribution of the lower value is negligible and the sum is simply the higher value.

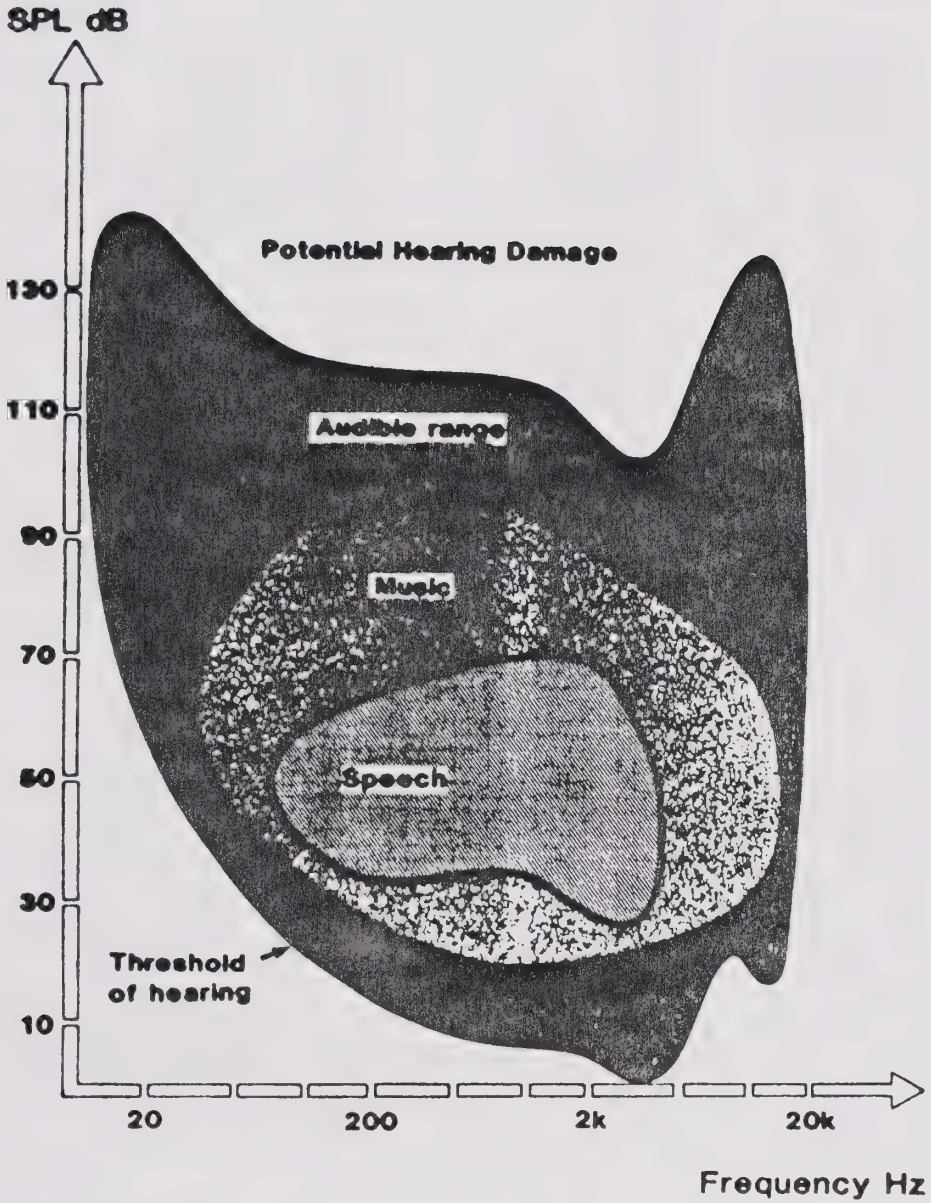


FIGURE A1 RANGE OF SOUND SPECTRA

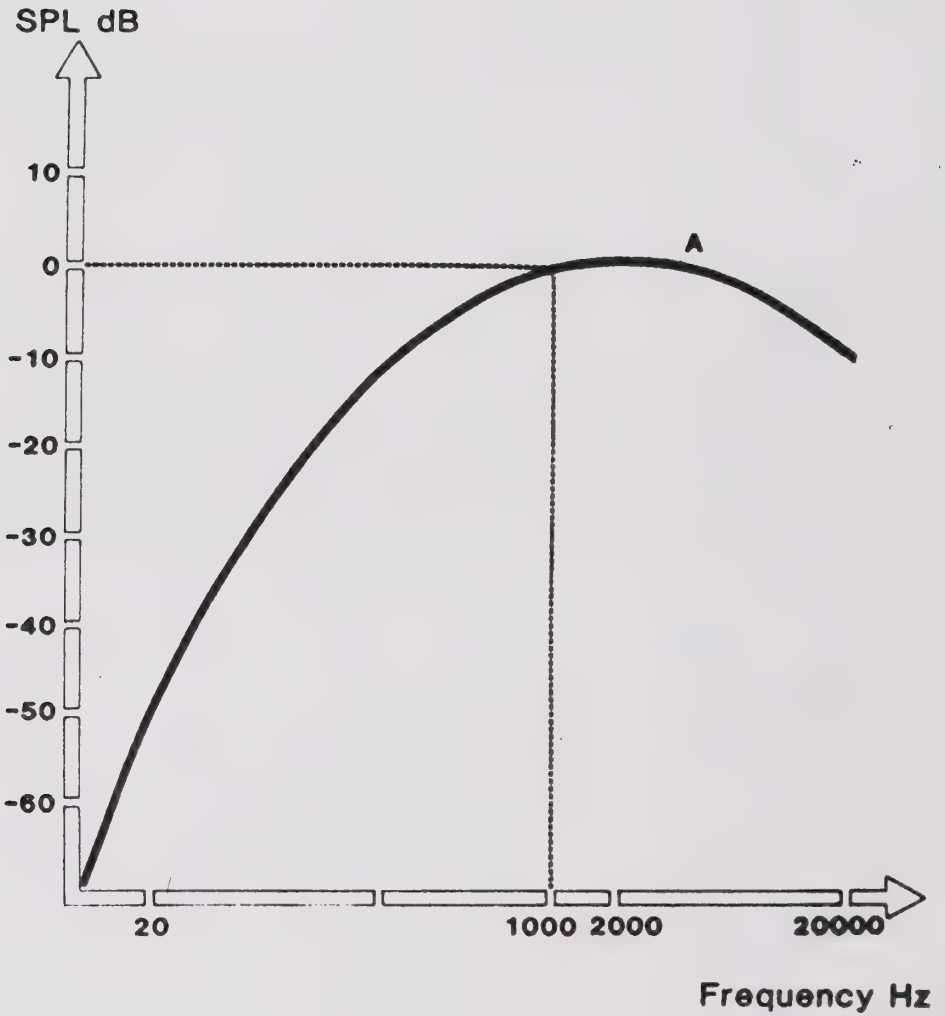
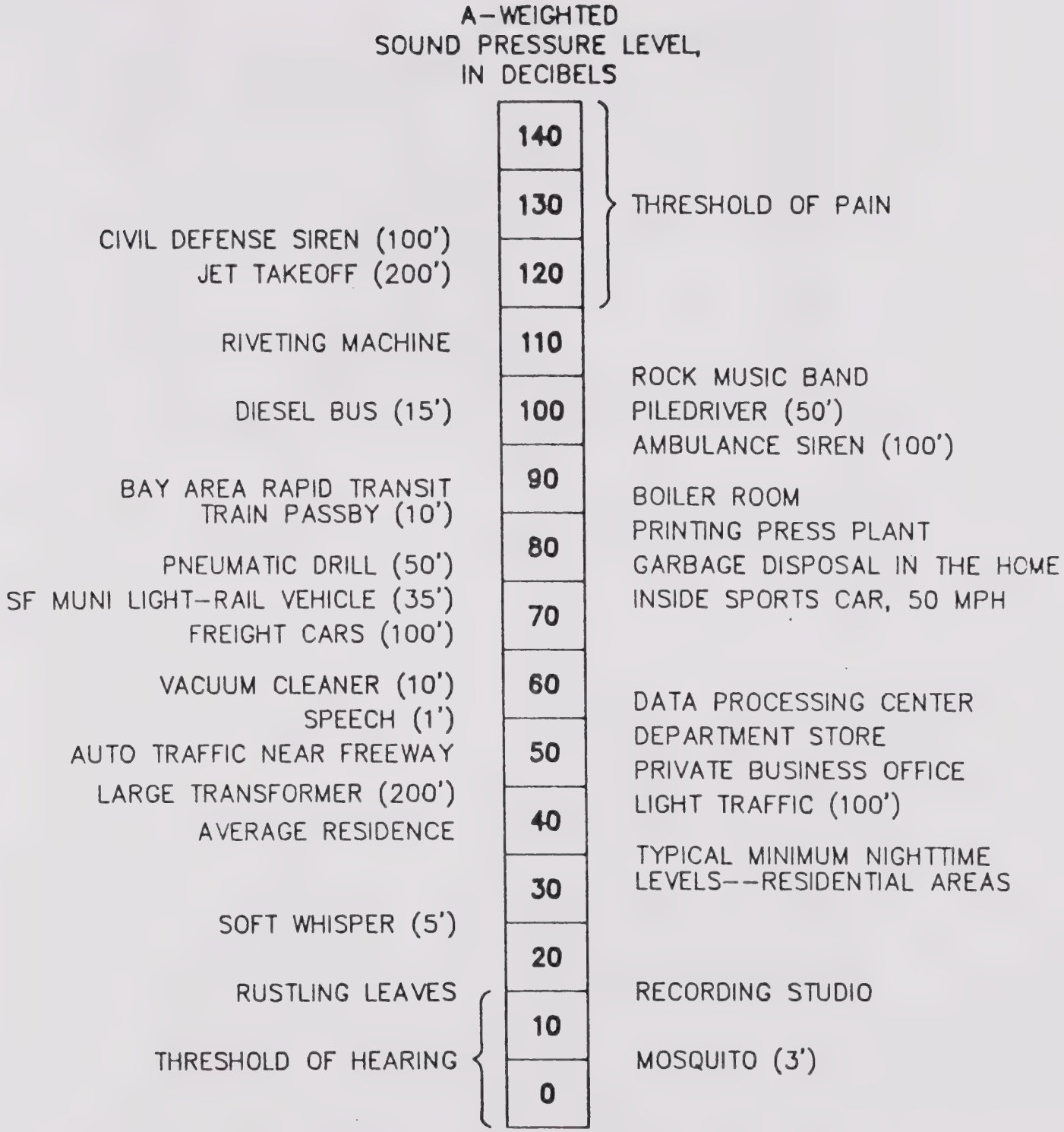


FIGURE A2 A-WEIGHTING NETWORK



TYPICAL SOUND LEVELS MEASURED IN THE ENVIRONMENT AND INDUSTRY

FIGURE A3

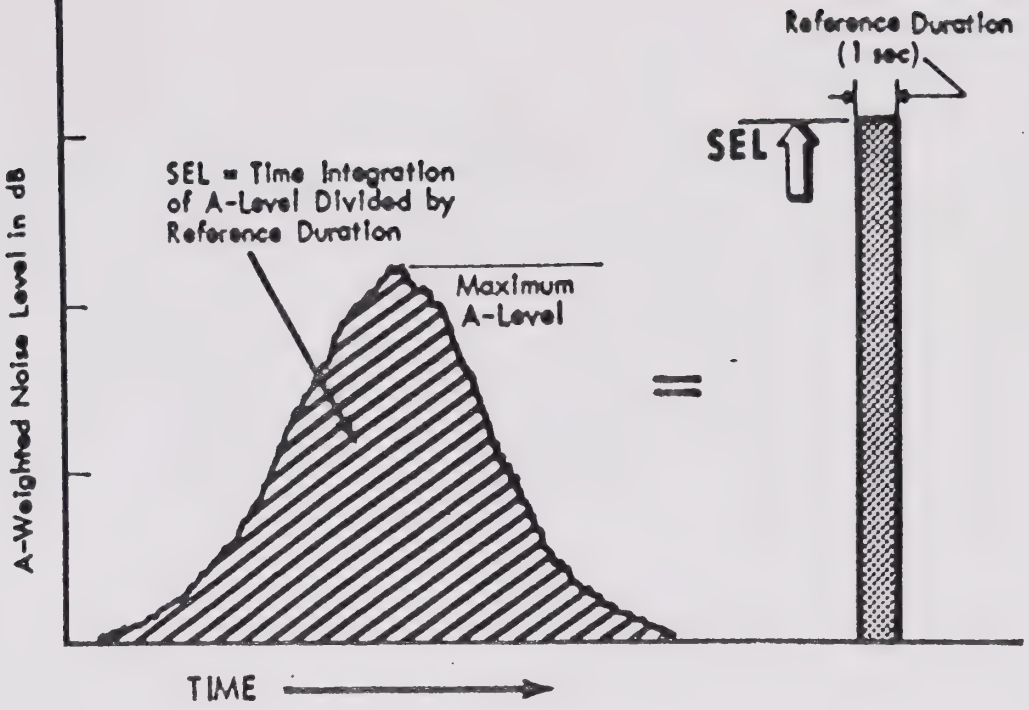


FIGURE A4 SOUND EXPOSURE LEVEL

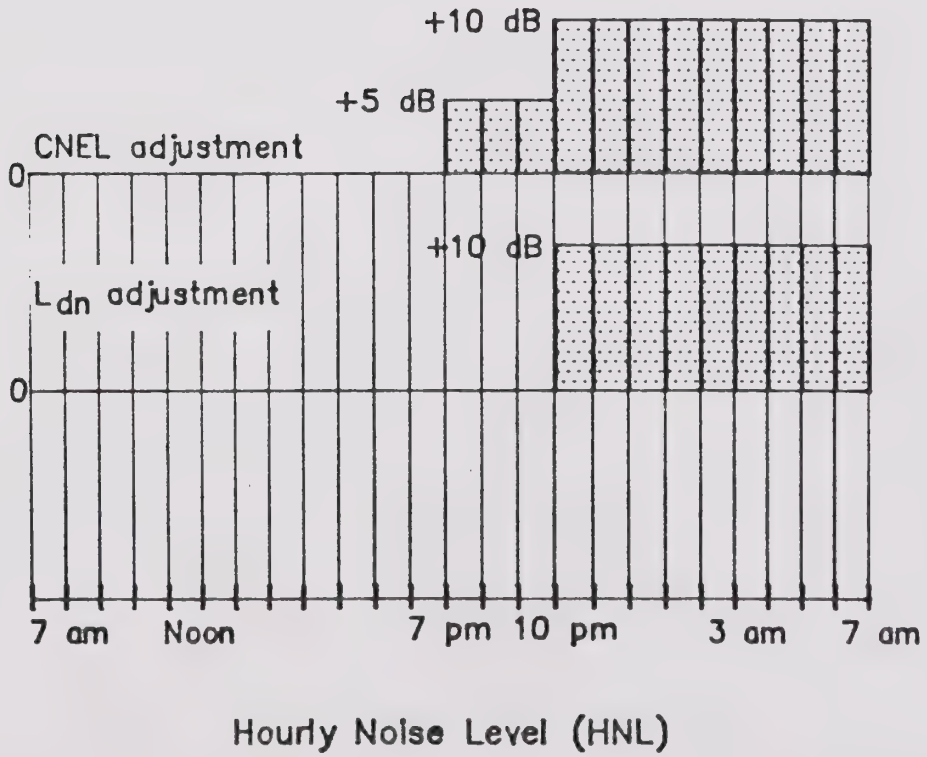


FIGURE A5 HOURLY NOISE LEVELS AND ANNUAL METRICS

APPENDIX B

File Name: SWR
Description: City Of South San Francisco
Shearwater Monitoring
Feb 28 - Mar 2, 1990
Report Date: 03-02-1990 Time: 08:58:04 Engr: JCF
Serial #: 70080380

D A T A R E P O R T

Run Date	02/28
Stop Date	12/31
Run Time 1	14:00
Stop Time1	99:00
Run Time 2	99:00
Stop Time 2	99:00
R/S	01
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Time	0038:31:44
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Lmax	83.5
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L10	63.0
L33	60.5
L50	59.0
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Pk Exc	0000
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Crit	90.0
Thld	32.0
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Hyst	5
Excd	1
Intv	1
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Ln	1
Hist	0
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Per	60.0
Detc	SLOW
Wght	A
Pk Unwgt	0
Cal	17.5

File Name: SWR
Description: City Of South San Francisco
Shearwater Monitoring
Feb 28 - Mar 2, 1990
Report Date: 03-02-1990 Time: 08:58:04 Engr: JCF

EXCEEDANCE REPORT

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3	69.0	79.0	72.5	85.5	28 FEB	14:48:32	0:10	0	0
4	70.5	86.0	75.0	88.5	28 FEB	14:49:29	0:35	0	0
5	69.5	75.5	71.5	83.0	28 FEB	14:50:08	0:04	0	0
6	69.0	80.0	71.0	85.5	28 FEB	15:34:16	0:13	0	0
7	71.0	80.5	74.5	90.5	28 FEB	15:48:15	0:08	0	0
8	71.0	83.5	74.5	88.0	28 FEB	15:48:32	0:17	0	0
9	71.0	80.0	74.0	89.5	28 FEB	15:52:24	0:08	0	0
10	69.0	80.0	71.5	84.0	28 FEB	16:03:09	0:11	0	0
11	67.5	75.5	71.0	85.5	28 FEB	16:15:30	0:05	0	0
12	70.5	83.0	72.0	85.0	28 FEB	16:16:27	0:17	0	0
13	72.0	82.0	76.0	90.5	28 FEB	16:29:56	0:10	0	0
14	70.0	78.0	72.0	84.5	28 FEB	16:37:42	0:06	0	0
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16	69.0	79.5	71.0	88.0	28 FEB	16:51:21	0:11	0	0
17	69.5	81.5	72.5	84.0	28 FEB	16:56:02	0:15	0	0
18	68.5	74.5	70.5	85.0	28 FEB	17:13:13	0:03	0	0
19	68.0	75.5	70.5	83.0	28 FEB	17:13:32	0:05	0	0
20	69.5	81.0	71.0	82.5	28 FEB	17:16:54	0:13	0	0
21	71.5	84.0	75.0	90.5	28 FEB	17:19:39	0:18	0	0
22	70.0	84.0	74.0	89.0	28 FEB	17:23:04	0:24	0	0
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24	69.0	79.5	70.5	83.0	28 FEB	17:33:16	0:11	0	0
25	75.0	89.5	79.0	92.5	28 FEB	17:34:24	0:27	0	0
26	69.0	77.5	71.0	83.5	28 FEB	17:39:25	0:06	0	0
27	69.5	79.5	70.5	83.0	28 FEB	17:44:07	0:09	0	0
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31	69.0	79.0	70.5	82.0	28 FEB	18:46:33	0:09	0	0
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39	70.5	84.0	75.0	91.5	28 FEB	19:27:21	0:22	0	0
40	72.5	81.0	75.5	87.5	28 FEB	19:31:06	0:07	0	0
41	70.0	77.0	72.5	84.0	28 FEB	19:37:30	0:04	0	0
42	70.0	80.5	72.5	88.0	28 FEB	19:41:00	0:10	0	0
43	69.5	78.5	72.0	88.0	28 FEB	19:50:06	0:08	0	0
44	70.0	74.5	73.0	88.5	28 FEB	19:56:52	0:02	0	0
45	69.0	75.5	72.5	88.5	28 FEB	20:12:14	0:04	0	0
46	69.0	76.5	72.0	85.0	28 FEB	20:12:23	0:05	0	0
47	72.0	88.0	78.0	92.0	28 FEB	20:12:52	0:39	0	0
48	72.0	83.5	78.5	96.5	28 FEB	20:16:07	0:13	0	0

E X C E E D A N C E R E P O R T

Cnt	Leq	SEL	Lmax	Lpk	Date	Time	Dur	Pk	Ov
49	70.5	82.5	73.0	89.5	28 FEB	20:41:04	0:15	0	0
50	68.0	78.5	70.5	83.0	28 FEB	20:51:11	0:12	0	0
51	68.5	79.0	71.5	86.5	28 FEB	21:06:49	0:10	0	0
52	68.0	76.5	71.0	85.0	28 FEB	21:16:09	0:06	0	0
53	68.0	77.0	70.5	85.0	28 FEB	21:16:28	0:08	0	0
54	67.5	78.5	71.0	84.0	28 FEB	21:16:48	0:11	0	0
55	71.5	88.0	76.5	89.5	28 FEB	21:21:37	0:46	0	0
56	75.5	89.0	80.0	94.0	28 FEB	21:32:04	0:20	0	0
57	71.0	86.0	75.5	89.5	28 FEB	21:32:50	0:31	0	0
58	73.0	87.5	78.0	92.0	28 FEB	21:49:44	0:28	0	0
59	68.5	77.5	72.5	88.0	28 FEB	22:07:41	0:08	0	0
60	70.5	80.0	73.0	88.0	28 FEB	22:12:30	0:09	0	0
61	69.0	81.5	73.0	88.5	28 FEB	22:12:49	0:18	0	0
62	70.0	83.5	76.0	94.0	28 FEB	23:09:04	0:22	0	0
63	69.5	74.0	72.0	90.5	1 MAR	4:47:29	0:03	0	0
64	68.0	77.5	70.5	81.0	1 MAR	5:07:15	0:08	0	0
65	68.5	71.5	70.5	87.5	1 MAR	5:31:37	0:02	0	0
66	70.5	81.0	72.5	86.0	1 MAR	6:14:09	0:11	0	0
67	69.5	81.0	72.5	86.0	1 MAR	6:48:05	0:13	0	0
68	70.0	83.5	72.0	85.0	1 MAR	7:14:44	0:22	0	0
69	69.5	79.5	71.0	86.0	1 MAR	7:18:46	0:10	0	0
70	70.0	78.5	72.5	87.0	1 MAR	7:19:11	0:07	0	0
71	68.5	78.5	70.5	83.5	1 MAR	7:54:01	0:09	0	0
72	72.0	88.0	76.0	94.5	1 MAR	8:16:16	0:40	0	0
73	67.5	78.0	70.5	83.0	1 MAR	8:18:53	0:11	0	0
74	69.0	82.0	73.5	88.5	1 MAR	8:20:34	0:18	0	0
75	70.0	76.0	73.5	87.5	1 MAR	8:27:19	0:03	0	0
76	69.5	77.5	73.0	85.5	1 MAR	8:41:45	0:06	0	0
77	69.0	84.5	72.5	88.0	1 MAR	9:08:02	0:38	0	0
78	69.5	82.0	72.0	86.0	1 MAR	9:14:05	0:19	0	0
79	71.5	86.0	77.0	90.0	1 MAR	9:22:55	0:28	0	0
80	69.5	86.0	73.0	88.0	1 MAR	9:27:31	0:40	0	0
81	69.0	78.0	72.0	84.0	1 MAR	9:28:27	0:07	0	0
82	71.0	85.5	73.5	89.5	1 MAR	10:04:05	0:27	0	0
83	69.0	80.5	71.5	86.0	1 MAR	10:07:24	0:14	0	0
84	69.5	87.0	76.0	94.0	1 MAR	10:08:55	0:53	0	0
85	69.5	83.5	72.5	87.0	1 MAR	10:10:57	0:25	0	0
86	71.0	79.0	72.5	90.0	1 MAR	10:14:06	0:06	0	0
87	69.5	80.0	71.0	83.0	1 MAR	10:14:37	0:12	0	0
88	71.0	78.5	72.5	84.0	1 MAR	10:38:51	0:05	0	0
89	69.5	78.0	72.0	83.0	1 MAR	10:39:19	0:07	0	0
90	70.5	77.5	72.0	87.5	1 MAR	10:42:28	0:05	0	0
91	70.5	82.0	73.0	86.0	1 MAR	10:54:01	0:14	0	0
92	69.5	84.0	73.0	87.0	1 MAR	11:00:08	0:28	0	0
93	69.0	78.0	72.5	89.0	1 MAR	11:07:19	0:08	0	0
94	70.5	85.0	73.0	88.0	1 MAR	11:25:00	0:29	0	0
95	72.0	82.5	75.0	87.5	1 MAR	12:01:07	0:11	0	0
96	67.5	77.5	70.5	83.0	1 MAR	12:12:17	0:09	0	0

E X C E E D A N C E R E P O R T

Cnt	Leq	SEL	Lmax	Lpk	Date	Time	Dur	Pk	Ov
97	68.5	76.0	71.5	84.0	1 MAR	12:17:59	0:05	0	0
98	71.5	84.5	74.5	88.5	1 MAR	12:18:09	0:20	0	0
99	68.5	78.0	70.5	80.5	1 MAR	12:28:40	0:09	0	0
100	69.5	83.5	71.5	88.0	1 MAR	12:39:20	0:24	0	0
101	69.0	80.5	72.0	87.0	1 MAR	12:49:32	0:13	0	0
102	68.0	73.0	70.5	81.5	1 MAR	12:49:55	0:03	0	0
103	69.0	74.0	71.5	85.5	1 MAR	12:56:14	0:03	0	0
104	69.5	74.5	72.5	91.5	1 MAR	13:19:42	0:03	0	0
105	72.0	85.0	74.5	89.5	1 MAR	13:23:31	0:19	0	0
106	76.0	89.5	82.0	98.5	1 MAR	13:38:22	0:22	0	0
107	72.5	85.5	76.0	92.5	1 MAR	13:38:51	0:19	0	0
108	68.5	79.5	73.5	93.0	1 MAR	13:41:33	0:12	0	0
109	69.5	79.5	71.5	86.0	1 MAR	13:46:14	0:09	0	0
110	70.5	83.5	73.0	87.0	1 MAR	13:50:49	0:19	0	0
111	68.5	76.0	71.0	86.0	1 MAR	13:57:24	0:05	0	0
112	69.0	77.0	71.0	86.0	1 MAR	13:58:47	0:06	0	0
113	71.0	85.0	74.5	89.0	1 MAR	13:59:04	0:26	0	0
114	71.0	85.0	76.0	93.0	1 MAR	14:02:42	0:26	0	0
115	69.5	80.0	70.5	82.5	1 MAR	14:15:14	0:12	0	0
116	69.5	78.5	73.5	88.0	1 MAR	14:20:17	0:08	0	0
117	68.5	77.0	71.5	85.5	1 MAR	14:20:26	0:07	0	0
118	70.0	82.5	73.5	91.0	1 MAR	14:22:08	0:17	0	0
119	68.0	73.5	70.5	82.0	1 MAR	14:42:19	0:03	0	0
120	69.0	75.0	71.5	85.5	1 MAR	15:11:25	0:04	0	0
121	68.5	80.0	71.5	86.0	1 MAR	15:11:45	0:13	0	0
122	69.0	76.5	71.5	86.0	1 MAR	15:15:06	0:05	0	0
123	69.5	77.5	72.5	93.0	1 MAR	15:19:09	0:06	0	0
124	69.0	77.0	72.0	87.0	1 MAR	15:30:33	0:05	0	0
125	70.5	81.5	75.5	91.5	1 MAR	15:41:04	0:12	0	0
126	69.5	74.0	72.5	89.5	1 MAR	15:41:26	0:03	0	0
127	69.0	79.0	70.5	83.0	1 MAR	16:15:42	0:10	0	0
128	70.5	84.5	74.5	89.0	1 MAR	16:22:05	0:26	0	0
129	68.0	76.0	70.5	82.0	1 MAR	16:29:07	0:06	0	0
130	67.5	80.0	70.5	85.5	1 MAR	16:33:12	0:16	0	0
131	70.0	86.0	74.0	89.0	1 MAR	16:37:04	0:41	0	0
132	69.5	85.5	72.5	87.0	1 MAR	16:55:07	0:40	0	0
133	72.0	80.5	74.0	88.5	1 MAR	16:59:47	0:07	0	0
134	71.5	83.5	75.0	89.0	1 MAR	17:14:39	0:15	0	0
135	69.5	84.5	72.5	85.0	1 MAR	17:15:51	0:33	0	0
136	71.0	82.5	74.5	88.0	1 MAR	17:20:08	0:15	0	0
137	72.5	83.5	77.5	94.0	1 MAR	17:28:18	0:13	0	0
138	71.0	84.5	72.5	87.0	1 MAR	17:33:25	0:23	0	0
139	70.0	82.5	72.5	84.5	1 MAR	17:45:00	0:18	0	0
140	69.5	76.5	73.0	87.5	1 MAR	17:45:37	0:05	0	0
141	70.5	83.0	72.5	86.0	1 MAR	17:45:50	0:17	0	0
142	71.5	84.0	74.0	88.0	1 MAR	18:16:43	0:17	0	0
143	75.0	88.5	79.0	93.5	1 MAR	18:19:57	0:23	0	0
144	71.0	85.0	73.0	86.0	1 MAR	18:20:27	0:27	0	0

E X C E E D A N C E R E P O R T

Cnt	Leq	SEL	Lmax	Lpk	Date	Time	Dur	Pk	Ov
145	72.5	86.5	77.0	91.0	1 MAR	18:46:34	0:26	0	0
146	72.5	80.0	76.5	95.0	1 MAR	18:47:02	0:05	0	0
147	74.5	89.5	79.0	91.5	1 MAR	19:08:46	0:31	0	0
148	69.5	77.5	72.0	86.0	1 MAR	19:13:02	0:06	0	0
149	69.0	77.5	70.5	82.5	1 MAR	19:13:27	0:07	0	0
150	69.0	85.0	72.0	86.5	1 MAR	19:21:51	0:38	0	0
151	68.5	79.0	71.0	83.5	1 MAR	19:30:27	0:11	0	0
152	72.5	80.0	75.0	87.5	1 MAR	20:14:57	0:05	0	0
153	68.0	82.5	72.0	88.0	1 MAR	20:20:03	0:28	0	0
154	69.0	77.5	70.5	85.0	1 MAR	21:06:49	0:07	0	0
155	68.5	84.0	73.5	92.0	1 MAR	21:09:05	0:37	0	0
156	70.5	83.5	73.5	87.0	1 MAR	21:12:10	0:19	0	0
157	70.5	87.5	78.0	92.5	1 MAR	21:13:46	0:47	0	0
158	76.0	89.0	83.5	100.5	1 MAR	21:22:10	0:18	0	0
159	68.5	76.5	70.5	85.0	1 MAR	21:24:06	0:06	0	0
160	67.5	79.5	70.5	84.5	1 MAR	21:30:24	0:17	0	0
161	77.5	92.5	82.0	97.0	1 MAR	22:16:40	0:31	0	0
162	68.0	78.5	70.5	83.0	1 MAR	22:31:33	0:10	0	0
163	69.5	82.0	71.5	86.0	1 MAR	22:51:39	0:17	0	0
164	70.0	81.5	72.5	87.0	1 MAR	23:02:12	0:15	0	0
165	69.5	83.5	71.5	85.5	1 MAR	23:06:21	0:25	0	0
166	70.0	85.0	72.0	84.5	1 MAR	23:15:29	0:29	0	0
167	77.0	92.5	82.0	95.0	1 MAR	23:44:26	0:35	0	0

Description: City Of South San Francisco
Shearwater Monitoring
Feb 28 - Mar 2, 1990

Report Date: 03-02-1990 Time: 08:58:04 Engr: JCF

INTERVAL REPORT

Cnt	Date	Time	Dur	Leq	Lmax	L10	L33	L50	L90	Lmin	Ex	Ov
1	28 FEB	14:00	1:00	62.0	75.0	64.0	61.5	60.5	59.0	53.0	5	0
2	28 FEB	15:00	1:00	62.5	74.5	64.0	62.0	61.5	60.0	57.5	4	0
3	28 FEB	16:00	1:00	62.5	76.0	64.5	62.0	61.0	59.0	56.0	8	0
4	28 FEB	17:00	1:00	63.0	79.0	64.5	61.5	61.0	59.0	57.0	10	0
5	28 FEB	18:00	1:00	62.0	81.5	63.0	60.0	59.5	58.0	56.0	6	0
6	28 FEB	19:00	1:00	62.5	75.5	65.5	60.5	59.5	58.0	55.0	11	0
7	28 FEB	20:00	1:00	62.0	78.5	64.0	61.0	60.0	58.0	55.0	6	0
8	28 FEB	21:00	1:00	61.5	80.0	63.0	59.0	57.5	54.5	52.0	8	0
9	28 FEB	22:00	1:00	58.5	73.0	61.0	57.0	55.5	53.5	48.0	3	0
10	28 FEB	23:00	1:00	56.5	76.0	58.0	55.0	54.0	51.5	48.0	1	0
11	1 MAR	0:00	1:00	52.5	62.5	55.0	52.5	51.5	48.5	44.0	0	0
12	1 MAR	1:00	1:00	51.5	66.0	54.5	51.0	49.5	46.0	42.5	0	0
13	1 MAR	2:00	1:00	49.5	64.0	52.0	49.0	48.0	44.5	39.5	0	0
14	1 MAR	3:00	1:00	51.5	65.0	55.0	50.5	49.0	43.5	39.0	0	0
15	1 MAR	4:00	1:00	52.5	72.0	55.5	52.5	51.0	47.5	42.0	1	0
16	1 MAR	5:00	1:00	56.5	70.5	59.0	56.5	55.5	52.0	48.0	2	0
17	1 MAR	6:00	1:00	60.5	72.5	63.0	60.0	59.0	56.5	54.0	2	0
18	1 MAR	7:00	1:00	61.5	72.5	64.0	61.0	60.0	58.5	55.5	4	0
19	1 MAR	8:00	1:00	62.5	76.0	64.0	62.5	61.5	60.0	57.5	5	0
20	1 MAR	9:00	1:00	63.0	77.0	65.0	62.5	62.0	60.0	57.0	5	0
21	1 MAR	10:00	1:00	62.5	76.0	64.5	61.5	60.5	58.5	55.5	10	0
22	1 MAR	11:00	1:00	61.5	73.0	63.0	61.0	60.0	58.0	55.5	3	0
23	1 MAR	12:00	1:00	62.0	75.0	64.5	61.5	60.0	57.0	53.0	9	0
24	1 MAR	13:00	1:00	63.0	82.0	64.5	61.0	60.0	58.0	52.5	10	0

INTERVAL REPORT

Cnt	Date	Time	Dur	Leq	Lmax	L10	L33	L50	L90	Lmin	Ex	Ov
25	1 MAR	14:00	1:00	62.0	76.0	64.0	61.5	60.5	58.0	55.0	6	0
26	1 MAR	15:00	1:00	61.0	75.5	63.0	60.5	59.5	58.0	56.0	7	0
27	1 MAR	16:00	1:00	62.5	74.5	65.5	62.0	61.0	58.5	56.0	7	0
28	1 MAR	17:00	1:00	63.0	77.5	65.0	62.0	61.5	60.0	58.0	8	0
29	1 MAR	18:00	1:00	62.5	79.0	63.5	61.5	61.0	59.0	56.0	5	0
30	1 MAR	19:00	1:00	62.0	79.0	64.0	61.0	60.0	57.5	55.0	5	0
31	1 MAR	20:00	1:00	60.5	75.0	63.0	60.0	59.0	56.5	53.0	2	0
32	1 MAR	21:00	1:00	62.5	83.5	64.5	61.0	60.0	58.0	55.5	7	0
33	1 MAR	22:00	1:00	61.5	82.0	61.5	59.5	58.5	57.0	54.0	3	0
34	1 MAR	23:00	1:00	61.5	82.0	61.5	58.0	56.5	54.5	51.0	4	0
35	2 MAR	0:00	1:00	54.0	63.5	56.5	54.5	53.5	50.5	46.5	0	0
36	2 MAR	1:00	1:00	50.5	63.0	53.0	51.0	49.5	46.0	41.0	0	0
37	2 MAR	2:00	1:00	51.0	63.0	53.5	51.5	50.0	46.5	41.5	0	0
38	2 MAR	3:00	1:00	54.0	67.5	57.0	54.0	52.5	49.0	43.0	0	0
39	2 MAR	4:00	0:31	54.5	65.0	57.0	54.0	53.5	51.0	47.5	0	0

File Name: SSFD
Description: City of South San Francisco
CSA 89-365 / Monitoring
Jan. 23-24,1990 / I-280
Report Date: 01-24-1990 Time: 14:45:41 Engr: JCF
Serial #: 70080478

D A T A R E P O R T

Run Date	01/23
Stop Date	12/31
Run Time 1	10:00
Stop Time1	99:00
Run Time 2	99:00
Stop Time 2	99:00
R/S	01
Memory	5084.0
LVL	72.2
Time	0024:47:48
SEL	121.8
Lmin	46.5
Lmax	91.5
Lpk	114.0
L10	75.0
L33	72.5
L50	71.5
L90	60.5
OVLD	00
RMS Exc	0011
Pk Exc	0000
Dose	4.9
Proj	1.6
Crit	90.0
Thld	32.0
Exch	3
RMS Thld	85.0
Pk Thld	140.0
Hyst	5
Excd	1
Intv	1
Dur	01:00
Auto-Stop	0
LDL	0
Ln	1
Hist	0
Save Pk	0
Per	60.0
Detc	SLOW
Wght	A
k Unwgt	0
Cal	16.0

E X C E E D A N C E R E P O R T

Cnt	LVL	SEL	Lmax	Lpk	Date	Time	Dur	Pk	Ov
1	86.5	95.5	89.0	101.0	23 JAN	12:11:45	0:08 m:s	0	0
2	85.0	92.5	87.0	100.5	23 JAN	12:36:15	0:05 m:s	0	0
3	85.0	93.0	86.5	99.5	23 JAN	12:59:26	0:06 m:s	0	0
4	88.0	98.0	91.5	104.5	23 JAN	13:28:40	0:09 m:s	0	0
5	86.5	95.5	88.5	104.0	23 JAN	14:01:07	0:07 m:s	0	0
6	87.5	97.0	90.0	104.0	23 JAN	14:38:18	0:09 m:s	0	0
7	85.0	93.0	86.0	98.0	23 JAN	15:00:06	0:06 m:s	0	0
8	86.0	95.0	88.5	101.5	23 JAN	19:36:45	0:07 m:s	0	0
9	87.0	97.0	89.0	102.0	23 JAN	19:44:30	0:09 m:s	0	0
10	84.5	90.0	86.0	101.0	24 JAN	6:25:56	0:03 m:s	0	0
11	84.5	88.0	87.5	114.0	24 JAN	10:47:42	0:02 m:s	0	0

INTERVAL REPORT

Cnt	Date	Time	Dur	Leq	Lmax	Lmin	L10	L33	L50	L90	Ex	Ov
1	23 JAN	10:00	1:00	73.0	84.0	62.5	75.0	73.5	72.5	69.0	0	0
2	23 JAN	11:00	1:00	74.0	80.5	62.0	77.0	74.5	73.0	69.5	0	0
3	23 JAN	12:00	1:00	73.5	89.0	62.5	75.0	73.0	72.0	69.0	3	0
4	23 JAN	13:00	1:00	73.0	91.5	63.5	74.5	73.0	72.0	69.0	1	0
5	23 JAN	14:00	1:00	73.5	90.0	61.5	74.5	73.0	72.5	69.5	2	0
6	23 JAN	15:00	1:00	73.0	86.0	63.0	74.5	73.5	72.5	70.0	1	0
7	23 JAN	16:00	1:00	73.0	79.0	65.5	75.0	73.5	73.0	71.0	0	0
8	23 JAN	17:00	1:00	73.0	79.0	66.0	75.0	73.5	73.0	70.5	0	0
9	23 JAN	18:00	1:00	72.5	80.0	63.5	74.0	73.0	72.5	69.5	0	0
10	23 JAN	19:00	1:00	72.0	89.0	63.0	73.5	72.0	71.0	68.0	2	0
11	23 JAN	20:00	1:00	70.5	76.0	62.5	72.5	71.0	70.0	67.0	0	0
12	23 JAN	21:00	1:00	70.5	76.0	62.0	72.5	71.5	70.5	67.0	0	0
13	23 JAN	22:00	1:00	70.5	78.0	60.5	73.0	71.0	70.0	66.5	0	0
14	23 JAN	23:00	1:00	68.5	75.5	59.0	71.5	69.0	67.5	63.5	0	0
15	24 JAN	0:00	1:00	66.0	75.0	53.5	69.0	66.0	64.5	60.0	0	0
16	24 JAN	1:00	1:00	63.0	74.5	49.5	66.5	62.5	60.5	54.5	0	0
17	24 JAN	2:00	1:00	61.0	74.5	46.5	64.5	59.5	57.5	52.0	0	0
18	24 JAN	3:00	1:00	61.5	74.5	47.0	65.5	60.5	57.5	52.0	0	0
19	24 JAN	4:00	1:00	64.0	77.0	48.0	68.0	63.5	61.0	54.0	0	0
20	24 JAN	5:00	1:00	70.0	80.0	56.5	73.0	71.0	69.0	63.5	0	0
21	24 JAN	6:00	1:00	74.0	86.0	65.5	76.0	74.5	73.5	70.5	1	0
22	24 JAN	7:00	1:00	74.5	85.0	67.5	76.5	75.5	74.5	70.5	0	0
23	24 JAN	8:00	1:00	75.0	84.5	66.0	76.5	75.5	75.0	72.5	0	0
24	24 JAN	9:00	1:00	74.0	83.5	63.5	75.5	74.0	73.5	70.5	0	0

INTERVAL REPORT

Cnt	Date	Time	Dur	Leq	Lmax	Lmin	L10	L33	L50	L90	Ex	Ov
25	24 JAN	10:00	0:47	73.0	87.5	63.5	75.0	73.5	73.0	69.5	1	0

File Name: SSFF
Description: City of South San Francisco
CSA 89-365 / Monitoring
Jan. 23-24,1990 / El Camino
Report Date: 01-24-1990 Time: 14:49:11 Engr: JCF
Serial #: 70081124

D A T A R E P O R T

Run Date	01/23
Stop Date	12/31
Run Time 1	10:00
Stop Time1	99:00
Run Time 2	99:00
Stop Time 2	99:00
R/S	01
Memory	4858.0
LVL	65.6
Time	0025:00:51
SEL	115.2
Lmin	41.0
Lmax	90.5
Lpk	105.5
L10	69.0
L33	65.0
L50	62.0
L90	48.0
OVLD	00
RMS Exc	0022
Pk Exc	0000
Dose	1.1
Proj	0.3
Crit	90.0
Thld	32.0
Exch	3
RMS Thld	80.0
Pk Thld	140.0
Hyst	5
Excd	1
Intv	1
Dur	01:00
Auto-Stop	0
LDL	0
Ln	1
Hist	0
Save Pk	0
Per	60.0
Detc	SLOW
Wght	A
Pk Unwgt	0
Cal	13.0

E X C E E D A N C E R E P O R T

Cnt	LVL	SEL	Lmax	Lpk	Date	Time	Dur	Pk	Ov
1	79.5	84.5	81.5	91.0	23 JAN	11:02:26	0:03 m:s	0	0
2	78.5	83.0	80.5	92.0	23 JAN	11:17:51	0:02 m:s	0	0
3	79.5	83.5	81.5	91.5	23 JAN	11:31:13	0:02 m:s	0	0
4	81.0	89.5	83.5	95.5	23 JAN	11:38:34	0:07 m:s	0	0
5	80.5	92.0	83.0	95.0	23 JAN	12:59:21	0:13 m:s	0	0
6	78.5	84.5	80.5	91.0	23 JAN	13:02:07	0:04 m:s	0	0
7	78.5	81.0	81.0	92.5	23 JAN	13:08:05	0:01 m:s	0	0
8	78.5	86.0	80.5	93.0	23 JAN	14:01:10	0:05 m:s	0	0
9	79.0	92.0	81.5	95.5	23 JAN	14:13:48	0:18 m:s	0	0
10	80.5	87.5	82.5	97.5	23 JAN	14:34:55	0:04 m:s	0	0
11	79.0	84.5	81.5	95.0	23 JAN	14:38:21	0:03 m:s	0	0
12	80.0	84.5	82.0	94.0	23 JAN	15:52:10	0:02 m:s	0	0
13	81.5	86.5	84.0	98.5	23 JAN	15:59:58	0:03 m:s	0	0
14	83.0	89.5	85.5	98.0	23 JAN	16:00:24	0:04 m:s	0	0
15	80.5	86.5	83.0	92.0	23 JAN	16:44:07	0:03 m:s	0	0
16	80.0	84.5	81.5	99.5	23 JAN	17:23:42	0:03 m:s	0	0
17	78.5	83.5	80.5	92.5	23 JAN	17:33:57	0:03 m:s	0	0
18	81.5	86.5	83.5	104.5	23 JAN	19:40:06	0:03 m:s	0	0
19	86.0	94.5	89.0	105.5	23 JAN	23:21:37	0:07 m:s	0	0
20	83.5	96.0	90.5	99.5	24 JAN	4:00:08	0:19 m:s	0	0
21	78.0	91.5	81.5	97.0	24 JAN	5:50:14	0:20 m:s	0	0
22	80.0	84.5	81.5	94.0	24 JAN	7:32:21	0:03 m:s	0	0

INTERVAL REPORT

Cnt	Date	Time	Dur	Leq	Lmax	Lmin	L10	L33	L50	L90	Ex	Ov
1	23 JAN	10:00	1:00	66.0	79.5	49.5	69.0	66.0	64.0	58.0	0	0
2	23 JAN	11:00	1:00	66.5	83.5	51.5	69.5	66.5	64.5	58.5	4	0
3	23 JAN	12:00	1:00	67.5	83.0	51.0	70.0	67.0	65.0	59.0	1	0
4	23 JAN	13:00	1:00	67.0	81.0	49.5	70.0	67.0	65.0	58.5	2	0
5	23 JAN	14:00	1:00	68.0	82.5	53.5	71.0	67.5	66.0	60.0	4	0
6	23 JAN	15:00	1:00	67.5	84.0	52.5	70.5	67.5	65.5	59.5	2	0
7	23 JAN	16:00	1:00	68.0	85.5	52.5	71.0	68.0	66.5	60.5	2	0
8	23 JAN	17:00	1:00	68.0	81.5	52.5	71.0	68.0	66.5	60.0	2	0
9	23 JAN	18:00	1:00	66.5	80.0	53.0	70.0	67.0	65.0	59.0	0	0
10	23 JAN	19:00	1:00	66.5	83.5	52.5	70.0	66.5	64.5	57.5	1	0
11	23 JAN	20:00	1:00	64.5	75.5	50.5	68.0	64.5	62.0	55.0	0	0
12	23 JAN	21:00	1:00	63.5	76.5	48.0	67.5	63.0	60.0	53.5	0	0
13	23 JAN	22:00	1:00	61.5	79.0	46.0	65.5	60.0	57.0	50.5	0	0
14	23 JAN	23:00	1:00	62.5	89.0	45.5	64.0	58.5	55.0	49.5	1	0
15	24 JAN	0:00	1:00	58.5	73.0	42.5	62.0	56.0	52.5	46.5	0	0
16	24 JAN	1:00	1:00	55.5	75.0	41.0	59.0	51.5	48.0	43.5	0	0
17	24 JAN	2:00	1:00	53.5	73.0	41.5	55.0	47.5	46.0	43.5	0	0
18	24 JAN	3:00	1:00	53.5	71.5	42.0	55.0	48.0	46.5	43.5	0	0
19	24 JAN	4:00	1:00	62.5	90.5	42.5	60.0	51.0	49.0	46.0	1	0
20	24 JAN	5:00	1:00	64.0	81.5	47.0	66.5	60.0	56.5	50.0	1	0
21	24 JAN	6:00	1:00	64.5	77.5	49.5	68.5	64.0	61.5	55.0	0	0
22	24 JAN	7:00	1:00	67.0	81.5	54.0	70.5	67.5	65.0	59.5	1	0
23	24 JAN	8:00	1:00	66.5	77.0	52.5	70.0	66.5	64.5	58.5	0	0
24	24 JAN	9:00	1:00	65.5	79.5	52.5	69.0	65.5	63.5	57.5	0	0

INTERVAL REPORT

Cnt	Date	Time	Dur	Leq	Lmax	Lmin	L10	L33	L50	L90	Ex	Ov
25	24 JAN	10:00	1:00	66.0	79.5	51.0	69.0	66.0	64.0	58.0	0	0
26	24 JAN	11:00	0:00	67.5	77.0	55.5	71.5	67.0	65.5	59.5	0	0

TABLE B

City of South San Francisco
Noise Monitoring Summary

Location/Noise Source	Traffic CNEL	Aircraft CNEL	Total CNEL
Shearwater	65	60	66
I-280	77	*68-	77
El Camino	68	64	70

*Aircraft CNEL contribution was less than 68 dB, probably approximately 60 dB.

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TABLE C

City of South San Francisco
Computation of Total CNEL

Traffic on Rail CNEL Value	Aircraft CNEL Value					
	60	62	64	66	68	70
60	63	64	66	67	69	70
62	64	65	66	68	69	71
64	66	66	67	68	70	71
66	67	68	68	69	70	72
68	69	69	70	70	71	72
70	70	71	71	72	72	73

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